ANNUAL MANAGEMENT REPORT

1983

BRISTOL BAY AREA

(FOR INTER-DEPARTMENTAL USE ONLY)

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

-1983-

BRISTOL BAY AREA

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March, 1984

MEMORANDUM State of Alaska

TO: Report Recipients

DATE: March 27, 1984

FILE NO:

TELEPHONE NO: 842-5227

FROM: Michael L. Nelson mlm
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Division of Commercial Fisheries
Dillingham

SUBJECT: 1983 Bristol Bay Annual Management Report

The attached report represents our continuing and most recent efforts to update and upgrade fishery statistics useful in describing the Bristol Bay salmon and herring fisheries.

Many of the new data tables first included in 1975 have been continued, and the major reorganization of fishery statistics which began in 1981, has been continued with this edition of the Bristol Bay annual management report. I believe this new revised edition of our annual management report series will be most useful in explaining and describing management rationale, as well as a better source for compiled catch, escapement and production information on all species of fish harvested in Bristol Bay.

This report is not intended for the general public and is for Inter-Departmental Use Only. It will be distributed only within Department circles with certain exceptions. Please route needed corrections or comments to me here in Dillingham.

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PREFACE

The 1983 Bristol Bay Management Report is the twenty-fourth consecutive annual volume reporting on and detailing management activities of the Division of Commercial Fisheries staff in Bristol Bay. This review emphasizes a descriptive account of the administration of the Bristol Bay commercial fishery resources, as well as outlining management objectives and procedures. Our basic objective in producing this document is to assist in creating a better understanding of the commercial fisheries management program in Bristol Bay.

Extensive reorganization of the documentation in this review, which was begun in 1975, represents our continued efforts to update and evaluate all information deemed necessary to fully explain the rationale behind management decisions formulated in 1983. The extensive set of tables and appendix tables represent our efforts to update past information and to record material previously unlisted that may be useful and informative. All narrative and data tabulations in this volume are combined under separate SALMON and HERRING sections to aid in the use of this document as a reference source.

Fishery data contained in this report supercedes information in previous reports. All 1982-83 catch data are preliminary pending receipt of final computer listings from fish ticket catches.

Data tabulation has been divided between current year TABLES (1983) and comparative APPENDIX TABLES (1964-83) in an effort to increase the ease with which this report may be used for reference purposes. Data reference sources on all appendix tables are numbered to correspond with document numbers in the Literature Cited section. Appendix tables generally include data over a 20-year time span (1964-83), except where information is not available. This report is considered to be "FOR INTER-DEPARTMENTAL USE ONLY".

Corrections or comments on the contents of this report should be directed to the area office at Dillingham, Attention: Editor.

Michael L. Nelson
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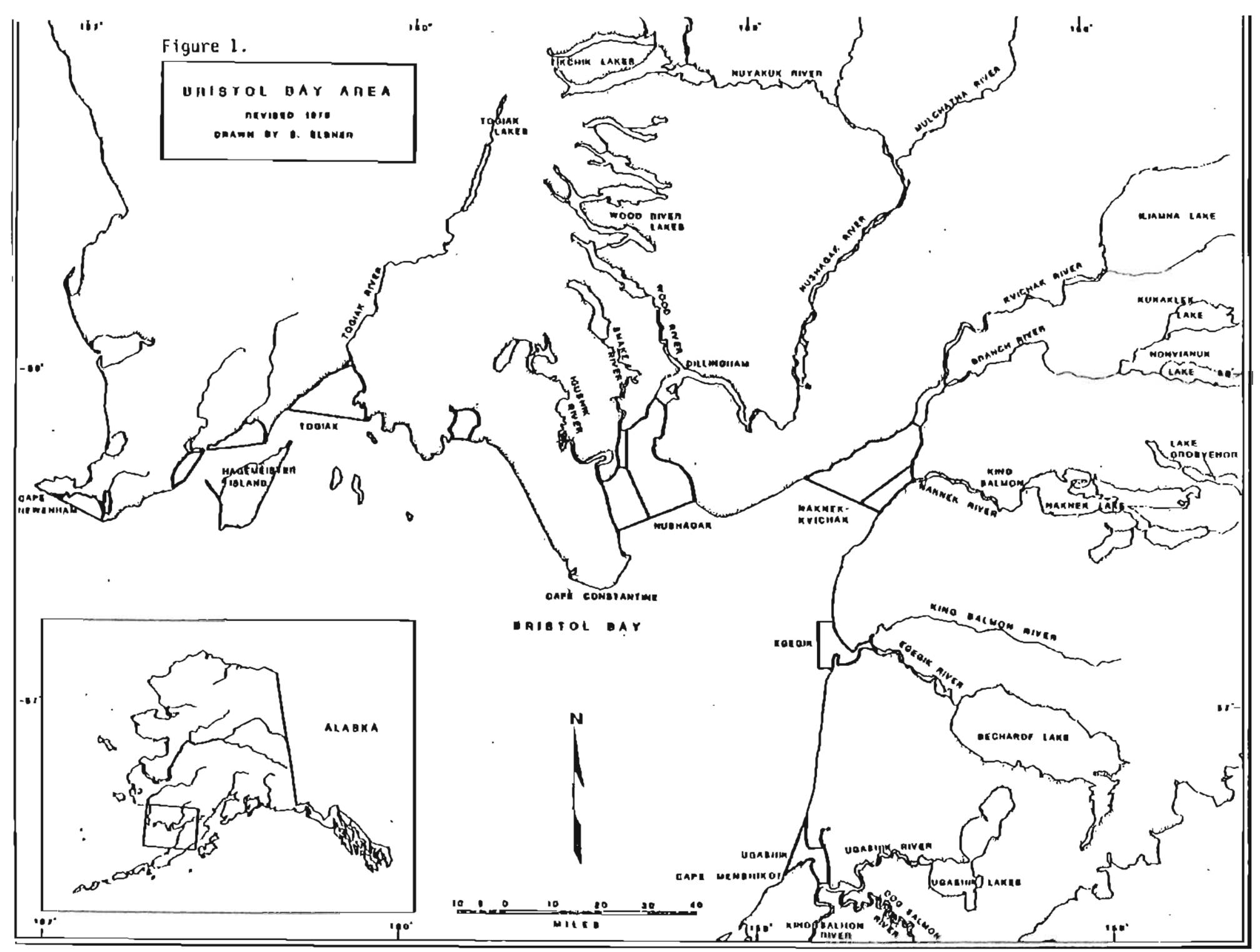
Figure 1.


BRISTOL BAY AREA
REVISED 1978
DRAWN BY B. ELSNER
TIKCHIK LAKES
NUYAKUK RIVER
NUSHAGAK RIVER
TOGIAK LAKES
WOOD RIVER LAKES
KIAMNA LAKE
KVICHAK RIVER
KUKAKLEK LAKE
BRANCH RIVER
NONVIANUK LAKE
TOGIAK RIVER
WOOD RIVER
SNAKE RIVER
KUSKOKWIM RIVER
DILLINGHAM
TOGIAK
HAGEMEISTER ISLAND
CAPE NEWENHAM
NUSHAGAK
CAPE CONSTANTINE
BRISTOL BAY
NAKNEK-KVICHAK
KING SALMON
NAKNEK RIVER
NAKNEK LAKE
LAKE ONONDYENOH
EGEGIK
KING SALMON RIVER
EGEGIK RIVER
BECHAROF LAKE
UGASHIK
UGASHIK RIVER
CAPE MENSHIKOF
UGASHIK LAKES
COD SALMON RIVER
KING SALMON RIVER
ALASKA
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10 5 0 10 20 30 40
MILES

TABLE OF CONTENTS

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TABLE OF CONTENTS (continued)

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TABLE OF CONTENTS (continued)

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TABLE OF CONTENTS (continued)

ANNUAL MANAGEMENT REPORT

BRISTOL BAY SALMON FISHERY

1983

INTRODUCTION

The Bristol Bay area, which includes all coastal waters and inland drainages east of a line from Cape Newenham to Cape Menshikof, is the largest sockeye salmon producing region in the world (Figure 1). In addition to substantial returns of other salmon species, the Togiak herring fishery has developed into the State's largest sac roe fishery.

The area wide salmon harvest during the 1983 season amounted to 39.1 million fish of all species, breaking the previous largest of 28.1 million in 1980, and was equal to one-quarter billion pounds valued at over $143 million to participating fishermen. Sockeye salmon completely dominated the commercial harvest, accounting for 37.3 million of the total, and breaking the previous high catch of 25.6 million set in 1981. The Bristol Bay harvest in 1983 accounted for 31% of the Statewide commercial catch, and helped to make 1983 the largest Alaska salmon harvest since records were first maintained in the late 1800's.

The management objective for all districts in Bristol Bay is the achievement of escapement goals for major salmon species while at the same time allowing for the orderly harvest of all fish surplus to spawning requirements. Escapement objectives were met in 1983 in all river systems where spawning requirements have been defined.

Runs of all species, except coho salmon, equaled or exceeded preseason expectations and were highlighted by an all time off-peak year sockeye salmon return of 45.8 million fish. The exceptional sockeye return in 1983 was the third largest ever recorded for Bristol Bay, with only peak-year total returns in 1965 (53.1 million) and 1980 (62.5 million) exhibiting larger runs.

FISHERY RUN STRENGTH INDICATORS

A total of 27.1 million sockeye salmon were forecast to return to Bristol Bay in 1983 (Table 1). A run of this magnitude would be nearly three times that of the comparable cycle year average return of 9.3 million fish. Should a return of this magnitude occur, a potential harvestable surplus of 21.3 million sockeye would be available to commercial fishermen after escapement requirements of 5.8 million were met. A harvest of 21.3 million sockeye would be considerably above both the comparable cycle year average harvest of 4.1 million and the peak year average harvest of 18.4 million.

Several independent forecasts for the 1983 return of sockeye salmon to Bristol Bay were available, and ranged from 20.0 to 43.5 million fish (Appendix B). A synopsis of key areas to watch as the run developed inseason in 1983 is provided in Appendix B, Table 3. A departure from the forecasted age composition would be a clear indication of forecast error, and careful monitoring of the early age composition should provide suitable warning of other than anticipated run strength.

Japanese High Seas Fishery

Since 1974 the Japanese high seas motherhip gill net fishery has seen a decreased high seas exploitation rate of Bristol Bay sockeye, brought on by bilateral negotiations between Japan and the United States and through renegotiation of the INPFC treaty. The mothership fleet was restricted again in 1983 by area and time restraints, which drastically altered past fishing patterns, and significantly reduced the interception rate of Bristol Bay sockeye.

Total Japanese high seas harvest by the mothership fleet from the 1983 Bristol Bay sockeye run included 228,000 fish caught as immatures in 1982, and 96,000 fish harvested as matures in 1983, or 324,000 fish and 1% of the total Bay run (Appendix Tables 4 and 5). This level of interception is well

below the recent 10 year (1974-83) average of 656,000, and only one-sixth of the interception rate prior to reduced fishing by the mothership fleet (Appendix Table 5). In addition, the continuing relatively low level of sockeye catches first established in 1979, by the Japanese land-based gill net fleet was also due to the renegotiation of the INPFC treaty (Appendix Table 3).

The Fisheries Agency of Japan also provided catch per unit of effort data from their high seas research vessels on immature sockeye salmon in waters south of the Aleutian Islands from which a comparative forecast of Bristol Bay run size was made. This forecast totaled 36.2 to 43.5 million, compared to the standard ADF&G forecast of 27.1 million (Appendix B, Table 1). There was a striking consistency in the sockeye ocean age composition of both forecast methods. Both of the Japanese data based forecasts from high seas sampling suggested a higher proportion of 2-ocean 5_3 age class returning than the ADF&G forecast (Appendix B, Table 2). If this were to occur, the ADF&G forecast would likely be much lower than the actual return. The actual sockeye salmon total return of 37.3 million 2-ocean fish was almost twice the forecast of 18.8 million, while the 3-ocean return of 8.0 million fish was within 4% of the forecast of 8.3 million (Tables 2 and 3).

Of particular concern to inshore domestic fishery managers in 1980 was the drastic increase seen in the interception of king salmon by the high seas mothership fleet. From 1964-79 the average king harvest was only 250,000 fish, but this interception rate increased three-fold in 1980 to 704,000 kings, the highest since the inception of the mothership fishery in 1952. Over 54% of the total king harvest in 1980 (or 380,000) were estimated to be of Western Alaska origin (Appendix Table 6). In response to concerns by the U. S., Japan voluntarily agreed to limit king salmon harvests by the mother-

ship fishery by agreeing to self-regulatory measures for a three year period (1981-83), which restricts the king harvest to 110,000 fish per year during this time. Actual mothership king harvests during this period was 88,000, 107,000 and 87,000, respectively (Appendix Table 6).

South Unimak/Shumagin Fishery

The inseason development of the Unimak/Shumagin June cape intercept sockeye fishery is closely monitored by Bristol Bay fishery managers because this fishery can be helpful in showing migration timing, relative abundance, age composition and fish size of the incoming Bristol Bay run. These intercept fisheries were again managed under a guideline quota harvest policy originally adopted in 1974 by the Alaska Board of Fisheries to prevent over harvest of sockeye runs to individual river systems in Bristol Bay.

The South Unimak quota was 1.5 million sockeye and the Shumagin quota was 324,000 (Appendix Table 55). The June quotas were further broken down into weekly time period quotas so that the catch would be spread out over the entire month. The actual catches were 1.5 million and 416,000 for the South Unimak and Shumagin Islands fisheries, respectively (Appendix Table 55).

Both Shumagin and South Unimak fishing success is highly dependent on weather conditions, which in turn affect migratory patterns of fish as they pass these cape fishery areas. Southerly winds tend to set fish onshore, and high fishing success from moderate sized runs can be obtained if these conditions persist.

The 1983 South Unimak and Shumagin Islands June fisheries were characterized by unusually large numbers of sockeye and chum salmon, ideal fishing weather, a record size fishing fleet, and relatively little fishing time allowed due to the high daily sockeye catches.

Daily sockeye catch rates were extremely high, causing weekly guideline harvest levels to be so greatly exceeded that the season guideline harvest was reached long before the last weekly period (June 26-30) was scheduled to begin. Both fisheries were open during the first six days of June, well before the peak of the runs. During the peak (June 12-25) only three and one-half days of fishing were allowed in the Shumagins, while South Unimak was open for five days.

Daily catches of sockeye salmon in the South Unimak fishery began to increase dramatically on June 6, after the price settlement. Under good fishing weather (nearly calm seas), catches accelerated rapidly, and through June 6 over 134,000 sockeye had been harvested, well over the weekly quota of 73,000 scheduled through June 11, and the largest accumulative catch by this date. Samples of the commercial catch through June 6 from both the South Unimak and Shumagin fisheries showed a close agreement with the Bristol Bay preseason forecast, and that the sockeye were averaging 5.1 to 5.3 pounds in weight.

Fishing resumed in both areas on June 12, and heavy fishing followed for the next three days under generally good to excellent weather conditions. South Unimak sockeye catches for June 12-14 were 235,000, 265,000 and 261,000, respectively, while Shumagin catches were 93,000, 82,000, and 76,000 for the same three day period, respectively. Again sampling effort at South Unimak showed close agreement with the Bristol Bay sockeye forecast age composition, with some evidence of a stronger show of 5_3 sockeye, a circumstance which had been pointed out in the Department's forecast evaluation analysis (Appendix B). The South Unimak sockeye catches continued to show an average weight of 5.1 to 5.3 pounds.

Record daily sockeye harvests were achieved on June 19, after a four day closure, at both South Unimak (404,000) and in the Shumagin fishery (129,000).

With the exception of one additional fishing period on June 21 at South Unimak, the quotas were met or exceeded and both areas remained closed the balance of June.

The large early season sockeye catches and lengthy closed periods required to remain within the weekly guideline harvest quotas, made it difficult to judge continuing run strength. It was evident, however, that a large sockeye run was on its way, and that timing was "slightly early".

Inseason staff assessment placed the Unimak sockeye peak between June 14-19, although lack of fishing time (June 15-18) during this period made it difficult to predict the peak. Normally South Unimak peaks between June 17-21, and on the average the peak of the Unimak fishery occurs about 13 days prior to the peak of the Bristol Bay commercial sockeye catch. Based upon Unimak catches, the Bay sockeye run was expected to peak between July 2-4 in the major districts. Actual run timing in the Naknek-Kvichak and Nushagak districts suggested that both areas peaked on July 2-3 (Table 16).

Port Moller Test Fishing Project

The Department's Port Moller test boat provides information on sockeye and chum salmon run timing and magnitude and age and size composition of the incoming run one week in advance of the inshore fishery.

Initial estimates of sockeye run strength were made based on the relationship between return per index and mean length and weight, and as the season progressed, from lag time analysis. The first total run size estimate based on Port Moller sampling and the mean length relationship was made on June 24, and totaled 45.0 million fish, virtually identical to the final total run of 45.8 million. Continuous age composition sampling from the initiation of sampling at Port Moller on June 9, indicated an extremely close correlation

between forecast and actual age of fish caught at Port Moller. The ability to accurately predict the ocean age composition of the inshore sockeye return early in the season has continued potential for inseason evaluation of the forecast.

In 1983, 100 chum salmon were caught during sampling at Port Moller, generating only 54 total index points including values interpolated for missed fishing time (Table 6). The season chum forecast based upon the historic mean of 12,800 inshore fish per index point was 690,000, only 38% of the actual run of 1.8 million (Appendix Table 7). No catchability adjustments have been used to describe any variability about the historic mean return per index value because of the relative stability in Bristol Bay chum salmon mean weight and length. The failure of the Port Moller project to adequately identify chum salmon run strength this season is not understood, but net avoidance and general migration tendencies of chums to run deep may offer some explanation.

FISHERY HARVEST POTENTIAL

Commercial fishing effort in 1983 was expected to be near peak record levels of recent years in recognition of the large forecast sockeye return. Nearly 2,800 units of gill net gear registered, although not all of this effort actually participated in the fishery (Appendix Table 9). Estimates of peak fishing effort on July 1-4 showed that actual drift effort was approximately 100% of that registered, and set net effort was 91% of available registered gear. In 1982, approximately 95% of preseason registered effort participated at one time in the fishery, and participation in 1983 was equal or higher (Appendix Table 9). Participation in the fishery in both total numbers and percent of total has been increasing in recent years, and is no doubt due

to both the high exvessel value of the product as well as the need of fishermen to make good on recently purchased entry permits and new fishing vessels (Appendix Table 9).

Formal total run forecasts for other salmon species returning to Bristol Bay are generally not made because good escapement data are limited for these species. However, catch projections are made based on relative estimates of parental run size, average age composition data, and recent relative productivity patterns. Catch potential and actual harvests for all species were as follows:

Species	Harvest in 1,000's of Fish	
	Potential	Actual
Sockeye	21,342	37,277
King	200	201
Chum	1,000	1,467
Coho	400	116
Total	22,942	39,062

The catch of all species of salmon was 39.1 million, surpassing the previous record of 28.2 million in 1980 by 11.0 million fish (Appendix Table 15). The total return of sockeye to Bristol Bay was 45.8 million, surpassing the preseason forecast by 18.7 million. This unexpected return was mostly due to large returns to the Kvichak (19.9 million) and Egegik (7.5 million) River systems (Table 4). The catch of king and chum salmon were comparable to recent years, whereas the catch of coho salmon was down from the recent high catches. The low coho harvest was due, in part, to reduced fishing effort and to reduced returns in the Togiak and Nushagak fishing districts.

The salmon canning industry made all of the Bay's available canning lines operational, which numbered 17 1-lb. talls, 18 ½-lb. flats, and 3 ¼-lb. flats in 11 plants (Table 28). In addition to the land-based canning operations, 51 companies operated in the Bristol Bay area in 1983 in the fresh export, brine or refrigerated sea water (RSW) export, frozen and cured salmon marketing areas (Table 28). A total of 62 processors/buyers reported catches in Bristol Bay in 1983 compared with 72 in 1982.

Even though 1983 saw record daily salmon catches, very little, if any, harvest was lost due to processor limits or suspensions. The sockeye run held in most districts, and the "holding pattern" allowed very high harvest rates, all of which kept the escapement from rapidly outdistancing the catch.

Post-season analysis showed that daily sustained processing production in 1983 amounted to 2.1 million fish for 16 days from June 28 through July 13, compared with 1.2 million fish in 1982 and 1.6 million in 1981.

FISHERY ECONOMICS AND MARKET PRODUCTION

Unlike previous seasons, when price disputes delayed or tied up virtually the entire fishery until an agreement was reached, this season saw one major fishermen's group, the Alaska Independent Fishermen's Marketing Association (AIFMA), conclude a price agreement with several major processors by December of 1982. The other major fishermen's association, Western Alaska Cooperative Marketing Association (WACMA), concluded price agreements in February of 1983, and as a result, the early spring of 1983 was devoid of a "price war" for the first time in many years.

Final fish prices in 1983 have yet to be determined, as the AIFMA association concluded a three-year agreement which began with a base price of $.58 per pound for sockeye, $.25 for chums and $.50 for kings, and tied the final price to the value of the product from August, 1983 through March 15, 1984 (Appendix Table 46). The other major association (WACMA) agreed upon a final price of $.65 for sockeye and coho, and $.32 for chums (Appendix Table 46). Assuming that the $.65 per pound WACMA price is close to the final average paid to all fishermen, the 1983 price paid for sockeye would be a reduction of 7% over 1982 prices. King salmon prices fell over 44%, from $1.23 per pound in 1982 to $.69 in 1983, and chums brought $.32 in 1983 compared to $.30 in 1982 (Table 32 and Appendix Table 46).

Exvessel value (or value to the fishermen) of the 1983 Bristol Bay salmon fishery harvest, establised on the fixed base level price structure, was $134.8 million (Table 32). If the final price paid for sockeye and chum salmon is equal to that paid WACMA fishermen, $.65 and $.32, respectively, the exvessel value of the 1983 salmon harvest rises to $143.6 million, highest in the State, and accounting for 44% of the total estimated exvessel value of Alaska's entire salmon harvest (Table 32).

The increasing trend of salmon production in the fresh export and frozen/cured processing categories continued in 1983. Frozen salmon production in Bristol Bay totaled 109.0 million pounds of all species in 1983, up significantly from 1979-82 when 42.9, 38.3, 54.7 and 68.0 million pounds were processed in this manner (Table 29 and Appendix Table 50). The heavy daily sockeye production in 1983 resulted in a dramatic increase of canned production over previous years; however, the rapid shift in emphasis from canning to frozen and fresh markets continued and is shown below since 1978 by comparing the percent of total Bristol Bay production of all species by product type:

Type Production	Percent of Total Production					
	1978	1979	1980	1981	1982	1983
Canned	63	36	34	38	15	21
Frozen/Cured	12	32	27	36	61	53
Fresh Export	9	18	18	13	21	14
Brine/RSW Export	16	14	21	13	3	12

1983 COMMERCIAL SALMON FISHERY

All five species of Pacific salmon are found in Bristol Bay and are the focus of commercial, subsistence and sport fisheries. The sockeye salmon run is the most significant, but there are also important runs of king, chum, coho, and in even-years, pink salmon. Numerically, based on 20-year data (1964-83), the average annual commercial catches are as follows: 11.8 million sockeye salmon; 128,000 kings; 812,000 chums; 123,000 cohos; and 1.8 million even-year pink salmon (Appendix Tables 10-14). Subsistence catches average approximately 150,000 salmon per year, mostly sockeye, while sport fisheries operate to varying degrees of intensity on all species of salmon, with most effort directed toward king and coho salmon stocks.

Bristol Bay is divided into five major and discrete fishing districts that are related to major river systems entering the Bay (Figure 1). Consequently, they are also the main migratory routes through which salmon must pass to ascend these rivers. The fishing districts are intentionally confined to areas as near as practical to the river mouths in order to minimize the interception of salmon destined for other, adjacent river systems. Specific river stock management is highly desirable and the physical geography of Bristol Bay is advantageous in this regard. Some districts are further divided into sections in order to accomodate local geographical features where several stocks may be involved, and to provide more management flexibility in controlling the exploitation rate on individual river system stocks.

Contrary to recent previous years when early season fishing time was reduced as fishermen and processors negotiated salmon prices, 1983 saw early price agreements and fishing schedules were not adversely affected.

Sockeye Salmon

The sockeye salmon run progressed evenly and pretty much on schedule through the South Unimak/Shumagin cape fisheries and past the Department's test fishing site at Port Moller. Preseason run timing based on: (1) Adak-Cold Bay air temperatures indicated a July 2 peak for Naknek-Kvichak and July 3-4 for Nushagak district; (2) South Unimak/Shumagin sockeye catches indicated a July 2-4 peak; while (3) the Department Port Moller test boat basically confirmed the "slightly early" run timing. Actual run timing in the Naknek-Kvichak and Nushagak districts peaked on July 2-3 (Table 16). In addition to run timing information, the Port Moller test fish program gives indications of run size (magnitude) and age composition of the sockeye run one week in advance of the inshore Bristol Bay fishery. Sampling of the sockeye run as it passed Port Moller indicated an age composition nearly identical to the forecast. However, run magnitude based on gill net sampling indicated a run considerably stronger than the forecast of 27.1 million fish.

It became readily apparent that a very strong sockeye run was in progress as the fish began entering the commercial fishing districts in the Bay (Table 16). Also apparent was the "holding pattern" of sockeye in virtually all districts. Fish movement and run timing was near normal as fish moved into Bristol Bay from the Bering Sea, but there was considerable delay in fish movement through the commercial districts and into the river systems. The delay resulted in very high initial harvest rates (up to 95%) and low sockeye escapement past the fishery. The unusual holding pattern was thought to be a result of warmer than normal water temperatures, and especially to the very low discharge of water volume due to lack of snow-pack and low spring rainfall. River discharge in most rivers was well below normal, and fish migration patterns were abnormal once the fish did enter the rivers, as evidence by: (1) flushing

of fish back past our inriver test fish sites, which in turn affected the reliability of escapement estimates produced; and (2) "wandering" of fish once in the rivers, which slowed upriver migration and contributed to lower efficiency of river escapement estimates by aerial surveys.

Actual returns of sockeye salmon compared to forecasted returns (millions of fish) are presented by river system below:

River System	Forecasted Return	Actual Return	Percent Error
Kvichak	9.7	19.9	106%
Naknek	2.9	5.4	83%
Egegik	3.4	7.5	121%
Ugashik	4.2	4.3	4%
Wood	3.3	4.5	40%
Igushik	0.6	0.7	6%
Nuyakuk	1.6	1.6	0%
Togiak	0.6	0.8	40%
Total	27.1	45.8	69%

Sockeye escapements exceeded preseason goals in all major manageable systems except Igushik, where the escapement was 180,000, or 90% of the preseason goal (Table 1). The surprising return to Kvichak River was due to very good survival of the 1979 brood year escapement of 11.2 million. There appears to be a cycle shift in the Kvichak due to the large prepeak escapement in 1979, as well as very good lacustrine growing conditions that contributed to a much higher fraction of 2-year old smolts than are normally produced from large escapements to this system.

The total Bay sockeye run in 1983 was 69% above forecast, compared with the 20-year average forecast error of 45% (Appendix Table 1).

King Salmon

Over 201,000 king salmon were commercially harvested in 1983, and the total harvest exceeded 200,000 for the fourth time in the past five years (Appendix Table 11). The Nushagak district, which normally accounts for over 70% of the Bristol Bay total return, produced a catch of 139,000 and escapement of 162,000, while the Togiak district contributed a catch of 38,000 and escapement of 22,000 (Appendix Table 41). Record or near record escapements were achieved in all districts.

Although total escapement estimates are not available for the smaller king salmon producing districts in the Bay, it is reasonable to assume that total runs have averaged well over 300,000 kings in recent years (1976-83) throughout Bristol Bay. In 1983 approximately 425,000 kings returned to all river systems (catch and estimated escapement combined), and the outlook for the next several years is promising due to very good brood escapements.

Chum Salmon

The chum salmon harvest in Bristol Bay was 1.5 million and was the fourth largest harvest in the history of the fishery. All time record catches were established at: Egegik - 124,000, previous best was 88,000 in 1981; Ugashik - 108,000, previous best was 50,000 in 1982; and Togiak - 323,000, previous high was 300,000 in 1980 (Appendix Table 12). Nushagak district produced an above average havest of 586,000 chums.

Escapements were strong to adequate in all districts where chum escapement surveys are conducted:

Naknek-Kvichak - adequate
Egegik - very strong
Ugashik - very strong
Nushagak - 164,000
Togiak - 165,000

Pink Salmon

Bristol Bay exhibits a very dominant even-year pink salmon run. The commercial harvest of less than 1,000 pinks and minimal escapement in 1983 is typical for odd-year pink returns.

Coho Salmon

The commercial coho salmon harvest of 116,000 was about equal to the 20-year long-term average, but was a disappointment after four consecutive years of strong returns (Appendix Table 14). The actual return exhibited late run timing, but the overall strength was well under that seen in past years.

Nushagak district's catch of 81,000 was below the recent 10-year average of 109,000, while the escapement of about 80,000 (sonar and aerial survey estimate) was deemed adequate. At Togiak the coho run did not materialize as expected, and this district was closed to fishing on September 5 to obtain additional escapement. The Togiak district did not reopen to fishing, as intensified aerial surveillance and analysis of weir counts from a new coho project initiated at Togiak this season, failed to detect adequate coho run strength. The eventual district coho escapement was estimated at 8-15,000 with a commercial harvest of only 6,000 (Table 15).

Coho catches in Naknek-Kvichak, Egegik and Ugashik districts were all well below recent year catches (Appendix Table 14).

1983 DISTRICT INSEASON SALMON MANAGEMENT SUMMARIES

Naknek-Kvichak District

More than 13.1 million sockeye salmon were forecast to return to the Naknek-Kvichak district in 1983, with an escapement goal of 3.0 million and anticipated harvest of just over 10.1 million fish (Table 1). Escapement goals did not change and were set for an off-cycle year, at 2.0 million for the Kvichak River. The Kvichak River forecast run was dominated by one age class, 68% age 4_2, while Branch and Naknek Rivers were forecast to be more evenly distributed between the four major age classes (Table 2).

The actual sockeye run to the district was nearly 26 million, with a 4.6 million escapement and a 21.3 million catch (Table 4). The Kvichak River run of 19.9 million was heavily dominated by the 4_2 age class (88%) indicating a sharp contrast in survival compared with the failure of four-year old fish which returned in 1982 (Table 3). The four-year age class runs to both the Naknek and Branch Rivers were both well above that forecasted.

Preseason management strategy called for early and frequent fishing in order to assess run strength, timing, age class composition and to harvest those fish in excess of escapement requirements. The 1982 run failure of four-year old fish was constantly on the minds of all involved.

The Port Moller test boat catch of 65 sockeye on June 16 was the first significant increase since the beginning of fishing on June 9 (Table 5). This year, a scale press was used on the vessel and scales were aged the same day as the fish were caught. The age composition of the run passing Port Moller was close to the Bristol Bay forecast with 4_2's and 6_3's slightly lower than forecast and 5_3's and 5_2's slightly higher than forecast. The estimated passage past Port Moller through June 16 was 3.9 million with an average weight of 5.9 pounds, nearly one pound less than in 1982 (Table 5).

Very few sockeye were entering the escapement through June 22 as evidenced by low passage rates past the Naknek and Kvichak River counting towers, minimal aerial survey estimates, and very few fish passing the Kvichak inside test fish site which began operations on June 21 (Tables 18 and 21). The commercial sockeye catch through June 22 was 270,000 (Table 10). The Port Moller test boat, meanwhile, recorded good indices on June 21 and 22, respectively, bringing the estimated total passage up to 10.6 million sockeye, and the age composition was gradually beginning to reflect that of the Bay forecast (Table 5). Due to the lack of escapement and apparent holding pattern of the fish outside the district, no opening was announced and the fishery closed on schedule with the beginning of the emergency order period at 9:00 a.m. on June 23.

The estimated passage past the Port Moller transect stood at 14.2 million sockeye through June 24 indicating that, if normal timing was assumed, the total run would be at or above forecast. Meanwhile, Naknek and Kvichak River tower escapement counts, and inside Kvichak River test fish catches continued to be low. Information from reliable fishermen indicated that the fish were entering the district but were going back on the ebb, and that some fish were even heading back out of the district on the flood tide. As long as these conditions persisted the district would remain closed until movement of fish into the rivers occurred.

On June 25 there were late afternoon reports of many jumpers in the lower Naknek River, and the Department's inside test fishing crew at Diamond J reported on the morning of June 26 that there were large numbers of jumpers in Kvichak River off Graveyard. Kvichak River inside test fish catches were zero on the morning tide, but very heavy on the east bank during the afternoon tide with little evidence of fish moving back out into the district during the ebb (Table 21). The Naknek River tower counts increased to over

6,000 sockeye per hour at 11:00 a.m. on June 26, and it was apparent that large numbers of fish were finally moving up the rivers. A 12-hour fishing period was subsequently announced to begin at 11:00 p.m. on June 27 (Table 9). Fair catches continued at Port Moller and an estimated 17.0 million sockeye had now passed the test fish transect site.

Inside test fish catches in Kvichak River on June 28 were high both tides, especially on the west side of the river. A fishing district survey flown that same morning showed that most of the drift net effort was on the upper west side off of Halfmoon Bay and Copenhagen Creek, with a few drift units on the east side in the channels west of Pederson Point. A record catch of over 1.8 million salmon were taken in the 12-hour opening (Table 10). The Naknek tower sockeye count through June 27 was 96,000 while fish were just beginning to pass Kvichak tower (Table 18). Port Moller test sockeye catches increased on June 28 as did the Kvichak inside test fish. The Naknek tower sockeye count through 2:00 p.m., June 28 was 164,000 while the Kvichak tower count increased to 61,000. With the foregoing positive signs, a second 12-hour fishing period was announced for June 29 (Table 9).

The estimated sockeye total past Port Moller through June 28 reached 18.2 million fish with good catches still being made on June 29 (Table 5). Inside test fish indices on Kvichak River were still strong with an estimated passage of 436,000 past Diamond J, and aerial surveillance on June 29 of Kvichak River produced an estimate of 580,000 fish (Table 21). Another fishing district survey on June 29 revealed that most of the drift effort was concentrated on the east side in the channels just above Libbyville and that catches remained strong. Sockeye tower counts through 2:00 p.m., June 29 were 350,000 on the Kvichak and 242,000 on Naknek. A 12-hour fishery extension was announced for the entire district through 2:00 p.m., June 30 based on the increasing escapement rates (Table 9).

Results of all escapement and run strength indicators were very encouraging. The accumulative tower counts through June 29 were 521,000 on Kvichak and 259,000 on Naknek Rivers, and were 26% and 32%, respectively, of escapement requirements (Table 18). The inside test fish project on Kvichak River estimated that 1.1 million sockeye had passed the project site in the lower river, and the passage through Port Moller was now estimated to be 18.6 million (Tables 5 and 21). Age class composition data from all projects and Port Moller indicated that the sockeye run would be no less than forecast. With the foregoing position signs, a 24-hour extension of fishing time for the entire district was announced through 2:00 p.m., July 1 (Table 9).

Information gathered throughout the day on June 30 led to a further extension of fishing time for the entire district through the end of the emergency order period on July 17, and waiver of the 48-hour waiting period for transfers into the district (Table 9). An aerial survey of Kvichak River on June 30 provided an estimate of just over 1.0 million fish and coupled with the tower count gave a total sockeye escapement estimate of 1.8 million, 90% of the goal (Table 21). The tower count/aerial survey estimate compared favorably with the inside test fish estimate of 1.6 million. The Naknek tower count through 6:00 p.m. was 313,000, 39% of the goal, while the Port Moller test fish boat continued to produce large index catches and was estimating a total of 21.5 million sockeye had passed the site through June 30 (Table 5).

The Naknek River sockeye escapement dropped on July 1 and totaled 355,000 through that date, while the count past Kvichak tower was 1.3 million (Table 18). Inside test fish indices on Kvichak River began to drop sharply as the fishing fleet began taking nearly all new fish that were moving into the district (Table 21). Concern at this time was that the Naknek River sockeye run may have been showing early run timing and might be weaker than forecast. All indicators of run strength continued to be closely monitored and district

surveys on July 2-3 revealed that nearly all the drift effort was on Kvichak fish and concentrated in the channels in the upper district, and that fishing effort had peaked at approximately 1,000 drift net units and 344 set net units (Table 11). Aerial surveys of Kvichak River on July 2-3 gave estimates of 305,000 and 72,000, respectively (Table 21). The July 3 aerial estimate, in addition to the tower count, gave a total sockeye escapement estimate of over 1.8 million for Kvichak River (Table 21). The inside Kvichak River test fish indices dropped significantly on July 2 but increased again on July 3, and the estimated sockeye escapement past that site now stood at just under 2.0 million (Table 21). Port Moller catch indices were high for July 2-3 and the total estimated passage through July 3 was now 29.9 million (Table 5).

The daily sockeye passage rate past Naknek tower dropped to 27,000 on July 4 and through 2:00 p.m., July 5 totaled 464,000, 58% of the goal (Table 18). For unknown reasons, most of the escapement in the Naknek River would pass between the hours of 9:00 a.m. and 3:00 p.m. with very little movement during the remainder of the day. Inside Kvichak River test fish catches dropped significantly again on July 4-6 (Table 21). Even though the escapement goal of 2.0 million was assured, it was almost entirely from the initial part of the run and the fleet was harvesting Kvichak sockeye at a 95% level. In order to strengthen the Naknek River escapement and to secure escapement from the middle part of the Kvichak run segment, a 14-hour closure of the entire district was announced from 5:00 p.m., July 6 until 7:00 a.m., July 7 (Table 9).

Commercial sockeye catches were still strong until the closure on July 6 and had been averaging over 1.5 million fish per day for the last eight days (Table 10). The accumulative catch through the closure stood at 12.9 million, almost as much as the total forecast to the district. The 14-hour closure produced some of the desired effects almost immediately, as the Naknek River

daily sockeye escapement jumped from 33,000 on July 6 to 66,000 on July 7 and the total now stood at 566,000, 71% of the goal (Table 18). The Kvichak River inside test fish catches also increased significantly on July 7 and the estimated passage by the end of the day was over 2.2 million fish (Table 21).

The last day of fishing for the Port Moller test boat was July 8 and the final estimated passage was 39.1 million sockeye (Table 5). The effects of the July 6 closure were short-lived on the Naknek River run, as the daily escapement dropped back to 29,000 on July 8, bringing the accumulative escapement to 595,000 (Table 18). District surveys of fishing effort on July 7-8 showed that the drift fleet was beginning to scatter more and many more boats were fishing the Naknek section than had previously. Catches along the south Naknek beach were very strong on July 7 and almost as strong on the following day. It was apparent that Naknek River sockeye were moving into and out of the Naknek section and lower river, but were not moving aggressively up the river. Through 6:00 a.m. on July 9 the Naknek River sockeye escapement was only 597,000, 75% of the goal. Commercial catches on both July 7 and 8 were 828,000 and 890,000 respectively, down from previous days (Table 10). A 28-hour closure of the Naknek section only was announced from 7:00 p.m., July 9 through 11:00 a.m., July 10 to improve the escapement rate (Table 9).

Sockeye were apparently still milling in the Naknek section and lower river through July 9-10, as daily counts were 33,000 and 22,000, respectively (Table 18). A 24-hour extension of the Naknek section closure was announced in order to obtain additional escapement. The additional closure finally produced the desired results as fish began to move up the river, and by 6:00 p.m., July 11 over 79,000 had passed the tower, bringing the accumulative escapement to 730,000, 91% of the escapement goal and well within the management range (Table 18).

The total sockeye catch of 21.3 million was the largest ever recorded, breaking the previous record of just under 21 million set in 1938. Preliminary district sockeye catch allocations totaled 16.4 million from the Kvichak River run, 4.5 million from Naknek and 456,000 from Branch (Table 4). The final sockeye escapement to the three rivers were 3.6 million in the Kvichak, 888,000 for Naknek, and 96,000 in Branch (Table 4). The total run to the Naknek-Kvichak district including high seas interception was over 26 million, nearly double the forecast. Other salmon catches included 10,000 kings, 326,000 chum and virtually no pink and coho salmon and altogether represented only 2% of the district catch (Table 17).

A total of 43 processors and buyers reported catches from the Naknek-Kvichak district during 1983, nearly the same as 1982 (Table 28). Production from the district was broken down as follows: 55.2 million pounds frozen and cured, 15.1 million pounds exported by air, 16.6 million pounds exported by tenders and the remainder was canned (Tables 29 and 30). A few processors had to stop taking fish for short periods and others were on some type of limits, but all did a commendable job in moving and processing fish. During the period June 28 through July 13, an average of over 1.2 million salmon per day were precessed (Table 16).

Several items of note regarding sockeye movement, timing and susceptibility to harvest are given below:

1. early Kvichak River fish did not move directly into the river but flushed in and out of the district for several days;
2. once fish began to move into Kvichak River, they did not flush back out on the ebb tides, but moved through and past the tower within 1-2 days;

3. nearly all of the drift fishing effort was concentrated in the channels of the upper district, as fish were seldom on or close to the beach;
4. the large amount of gear, the efficiency of the fleet and the concentration of fish in the channels produced a harvest rate of over 95% during fishing periods;
5. the Naknek River run was apparently bimodal with both parts of the run washing in and out of the lower river and section for several days; very few boats fished the lower east side until July 7;
6. the bulk of the Naknek River escapement moved past the towers during the hours of 9:00 a.m. through 3:00 p.m. with very few passing throughout the rest of the day; timing from river mouth to the tower was 19-20 hours; and
7. several unusual fish species were caught during the 1983 season, including a green sturgeon in a Naknek River subsistence net, and several sockeye salmon that were caught were found to have yellow bellies, eyes and cheeks and the body cavity contained yellow fluid.

Preliminary results of the subsistence fishery in the Naknek-Kvichak district indicate a total catch of 111,000 salmon, which was the second highest harvest in the past 20 years (Appendix Table 56). Only one personal use fishery permit was issued for the Naknek River. The main factors contributing to the low personal use catches in Naknek River were a lack of interest in the fishery and escapement goals being met late in the season.

The Department continued to test and evaluate improvements to the buoy and marker system in 1983. Solar panels and high amp hour batteries were placed on the two range lights at Johnson Hill in hopes that they would operate for the entire season. The lights did operate all season with the aid of excellent

weather conditions. Several petitions and letters from set net fishermen were received throughout the season requesting that if closures were necessary, the area remain open to set net fishing only.

Egegik District

The 1983 sockeye salmon run to the Egegik district totaled 7.5 million fish, the largest run on record for the district. It exceeded the preseason forecast of 3.4 million fish by 4.1 million and yielded a harvest of 6.7 million fish (Table 1). This season marked the fifth consecutive year in which sockeye harvests at Egegik have exceeded 2.0 million fish, well above the long-term 86-year average catch of 1.1 million. An escapement of 792,000 sockeye was achieved exceeding the point goal of 600,000 by 32%, but falling slightly below the 20-year mean of 834,000 (Appendix Table 21). Total sockeye runs returning during comparable cycle years dating back to 1953 have ranged from 0.6 to 2.1 million with a mean of 1.3 million, so the 1983 run ranks as the largest on record and was almost six times the long-term cycle year average.

The preseason forecast for the Egegik district indicated the run would be fairly well distributed across all major age groups and a potential harvest of 2.8 million sockeye was anticipated (Tables 1 and 2). Considering these factors and based on early run strength indicators from the South Unimak/Shumagin Islands areas, a fairly liberal approach to management of the district was adopted.

As fishermen's bargaining entities and the major salmon processors throughout Bristol Bay settled their price negotiations well before the fish arrived this year, there was no disruption of fishing effort due to price disputes during the entire season. Both the fishermen and processors were eager to get the season underway.

Initial commercial sockeye landings in the district occurred on June 7 from some set nets near Egegik village; however, catches remained small through early June but began to increase on June 20, due primarily to the entire drift gill net fleet testing their gear (Table 11). Aerial survey observations indicated peak drift gill net effort (225 boats) occurred in the district on June 20.

By the onset of the emergency order period on June 23, a harvest of 209,000 sockeye had been attained at Egegik (7% of the preseason forecast). Escapement past the counting tower totaled 5,000 fish with another 65,000 (based on inside test fishing data) believed to be present in the lower river (Table 22). The district was closed at 9:00 a.m., June 23 to allow additional early run fish to enter the escapement. Due to only a few fish moving upriver past the counting tower on June 23-25, and a very small showing of fish June 25 in the clear lagoon downstream of the tower site, test fish data at this point in the season wasn't considered entirely representative of actual escapement magnitude, as some "backing out" of fish from upstream was thought to be occurring. As a result of the small number of fish verified in the escapement by visual methods, the fishing closure lasted until 10:00 p.m., June 26 (Table 9).

A 14-hour commercial opening to test district run strength began at 10:00 p.m., June 26. Aerial monitoring of fleet success early June 27 indicated a huge sockeye catch was being taken with most of the effort occurring inside Egegik Bay. The district closed at 12:00 noon, June 27 for 24 hours to allow some of these "inside" fish into the escapement and to allow evaluation of the catch from the 14-hour opening. A catch of 472,000 sockeye was reported on June 27, the single largest daily catch on record for the district to date (previous record was 464,000 July 4, 1981 (Table 11).

Inside test fish indices responded immediately to the 24-hour commercial closure June 27 (Table 22). Good test catches were made on the "flood" tide and additional fish, as indicated by "jumpers", continued to move up past the test fish sites even on the "ebb" tide. Based on these test fish indicators and the record catches on June 27, the fishery was reopened for 12 hours beginning at 12:00 noon, June 28 (Table 9). It subsequently did not close again until the emergency order period expired July 17.

An aerial survey of Egegik lagoon at 6:00 p.m., June 28 indicated 113,000 sockeye were present in clear water below the counting tower (Table 22). The accumulative tower count through June 27 totaled 54,000, thus approximately 167,000 fish were visually accounted for in the escapement. Test fish data indicated another 200-220,000 were present in murky waters downstream of the "lagoon". These data indicating that at least 28% (and perhaps as high as 64%) of the escapement was assured, coupled with additional aerial observations that fishermen were catching good numbers of fish throughout the entire commercial district, and continued high inside test fish catches were the factors leading to a further 24-hour extension of the fishery beginning at 12:00 midnight June 28 (Table 9). The June 28 commercial catch totaled 337,000 sockeye (Table 11).

Acceptable rates of escapement during the June 28 - July 1 period prompted daily extensions of the commercial fishery. Massive daily catches were being recorded, nearly overtaxing available processing capacity (Table 11). The catch through July 1 totaled 2.3 million fish while escapement past the counting tower stood at 520,000, 87% of the point goal (Table 18). As additional fish were still entering the lower river it was evident the escapement goal would be easily met so at 6:00 p.m., July 1 commercial fishing in the district was extended until further notice and the 48-hour waiting period for

transfers into the district was waived (Table 9). The escapement goal was subsequently reached on July 4.

Huge commercial catches were made daily through July 14 with the July 7 catch of 474,000 sockeye eclipsing the June 27 catch as the all time single largest daily harvest on record (Table 11). The peak of the fishery based on catch rates, occurred June 27-28 (catch rates of 39,000 and 28,000 sockeye per hour, respectively). Peak fishing effort occurred July 4 with 378 units (drift and set nets combined) being fished (Table 11). Catches dropped off rapidly after July 14 with the last sockeye landings reported August 12.

Escapement rates peaked June 29-30 and then tailed off and a total sockeye escapement of 792,000 fish was achieved (Table 18). Although some escapement was obtained from each portion of the run, approximately 60% came from the peak period of the fishery (June 28 - July 1) with much lesser percentages coming from the later periods. In spite of the fact that the escapement goal was exceeded, it probably would not have been unsatisfactory management policy to have added another 100-150,000 fish from the July 6-10 period to the escapement as the run was exceptionally strong during that period and the escapement goal was set anticipating a large but not an all time record run to the district. In retrospect, an average escapement was obtained from the all time record run, and whether it will produce an average or another record return remains to be seen.

The sockeye run, primarily age group 5_3 (77%) apparently milled considerably in the district and even in the lower portions of the Egegik River before moving upriver (Table 3). This delay made fish very susceptible to harvest, especially near the entrance to and inside Egegik Bay proper. Fishermen harvested 90% of the total run, the highest exploitation rate in this district on record and well above the 33-year average of 65%. The milling

tendency made interpretation of inside test fish data more difficult than normal because the data tended to over-estimate escapement rates both early and late in the season. However, the data was quite representative of escapement rates at the peak of the run. Water temperature may have been a factor influencing milling behavior. Comparison (below) of the average July 1 water temperatures at Egegik tower over the last five years indicates the 1983 temperatures were significantly warmer (mean = 54.5°F/12.5°C) than the 5-year average (48.0°F/8.9°C):

July 1 Water Temperatures, in Degrees Fahrenheit/Celsius, Egegik River, 1979-83

Year	Maximum	Minimum	Average
1979	50.0°F/10.0°C	46.4°F/ 8.0°C	48.2°F/ 9.0°C
80	42.8°F/ 6.0°C	42.8°F/ 6.0°C	42.8°F/ 6.0°C
81	58.1°F/14.5°C	41.9°F/ 5.5°C	50.0°F/10.0°C
82	46.4°F/ 8.0°C	42.8°F/ 6.0°C	44.6°F/ 7.0°C
83	59.0°F/15.0°C	50.0°F/10.0°C	54.5°F/12.5°C
Mean	51.3°F/10.7°C	44.8°F/ 7.1°C	48.0°F/ 8.9°C

Although daily catches throughout the period June 28 - July 10 came close several times to exceeding capacity, there was only one brief instance reported of a processor being totally plugged during the season. The run came in very steadily and uniformly after its initial surge and that lead to nearly optimal processing utilization. Had the run surged in all at once over a 3-4 day period, as it has in some years, the processors would have quickly been plugged and the fishery would have had no chance of stopping the run. The entry pattern that developed was ideal for maximizing catch and production. Overall, fishermen fared very well in the district with the exception of set netters along the north outside beach near Big Creek. There were no large tides or heavy onshore winds at the peak of the run to drive fish onto the beach so they followed the channel into Egegik Bay and in doing so most missed the upper mile of set nets.

The commercial harvest of other salmon species in the district totaled 150,000 fish, 2% of the total district harvest and was highlighted by a 124,000 chum catch (Table 17). The large chum catch broke the previous single season chum harvest record of 88,000 set in 1981, and was approximately twice the long-term average (Appendix Table 12).

The king salmon catch of 5,000 was the fifth largest on record while the coho harvest of 22,000 ranked third on the all time list (Appendix Tables 11 and 13). Fall escapement surveys flown in the upper King Salmon River drainage (Contact, Takayoto, and Gerturde Creeks) indicated at least 2,000 kings and 16,000 chums had escaped the fishery to spawn (Table 20).

Thirty five processors and buyers operated in the district during 1983, a 3% increase over 1982, and total emphasis was on sockeye as only one operated during the coho season (Table 29). With the great abundance of fish caught in the district nearly all the companies had a successful buying season.

With the exception of one company that had a large tender capsize, and several set netters who experienced small catches along the north outside beach near Big Creek, the 1983 season was a success for nearly everyone involved in the fishery. Catches were large, processors operated all season, management was fairly straight forward and enforcement activities were fairly effective.

Ugashik District

The 1983 sockeye run to the Ugashik district totaled 4.3 million fish, the largest run on record eclipsing the previous high of 4.2 million set in 1980 and exceeding the preseason forecast (also 4.2 million) by 4% (Appendix Table 21). The total harvest of 3.3 million was also the largest on record far exceeding the previous high of 2.1 million set in 1981, and bettering the 20-year average of 585,000 by nearly a factor of six (Appendix Table 10). The escapement obtained, 1.0 million, was double the point goal (500,000) marking the fifth consecutive year that at least 1.0 million sockeye have reached the spawning grounds (Appendix Table 21). Compared to similar cycle years dating back to 1953, the 1983 run ranks as the largest on record exceeding the cycle year average of 555,000 by nearly a factor of eight. The run was primarily comprised (68%) of age group 4_2 fish, progeny from the 1979 parent escapement (Table 3).

Area managers were initially suspicious of the 1983 forecast for this district. During recent years the Ugashik run has been strongly cyclic in nature (five year cycle) and the normal parent year for this season's run would have been 1978, which was the second smallest run in the history of the fishery dating back to 1893. The forecast however, predicted a near record run based on the return of four-year old fish from the massive 1.7 million escapement in 1979. With these concerns in mind, a rather conservative management philosophy was initially implemented. If an abundance of four-year olds showed up early in the fishery a more liberal approach was an alternative.

Commercial fishing, primarily for king salmon, began in the district on May 30. About twice the normal number of drift boats participated in this early phase of the fishery. King salmon landings were higher than normal and peaked June 15-16 (Table 12). Sockeye catches in the district were light

(34,000 total) prior to the onset of the emergency order period on June 23. With only an estimated 1,000 sockeye in the river and considering that additional kings were needed in the escapement, the district was closed to fishing at 9:00 a.m., June 23 and it remained closed until 10:00 p.m., June 26 (Tables 9 and 12).

A 14-hour commercial opening at Ugashik was scheduled for June 26-27 to test fish distribution in the district and fleet efficiency (Table 9). The period yielded a catch of nearly 69,000 sockeye indicating the run was beginning to arrive (Table 12). Nearly all of this catch was taken by drift fishermen operating outside the entrance to Ugashik Bay. Scale analysis of this catch yielded 37% age group 4_2 and 51% age group 5_3 fish. However, not much confidence was placed on these data as there was a distinct possibility that the samples may have included some Egegik district fish as the tender took fish in both districts.

Through June 28 sockeye escapement past the counting tower totaled less than 1,000 fish (Table 18). Approximately 4,000 sockeye (based on inside test fish data) had passed through the lower river, and these figures were normal for this point in the season, however, the catch of 103,000 sockeye was far above average. The district was reopened to fishing on June 29 for 25 hours to again test run strength, distribution and age composition (Table 9).

Initial fishing success on June 29 was good, and fishermen, processors and spotter pilots all reported observing large schools of fish in the district, especially just outside the entrance to Ugashik Bay. Based on this information and the increasing percentage of age group 4_2 sockeye in the Port Moller test catches (approaching forecast levels) the commercial opening was extended another 24 hours (Table 9). Catches in other districts were also increasing and this extension helped keep adequate processing capacity present at Ugashik.

Approximately 370,000 sockeye were caught during the June 29 - July 1 period, and the accumulative catch through July 1 totaled 473,000 fish which was 16% of the preseason forecast. Large numbers of fish were present in the district, as indicated by the high catch rates, but they were milling rather than actively moving through the fishery and into the river. Escapement past the Ugashik tower through July 1 still totaled less than 1,000 sockeye (Table 18). With drift effort increasing rapidly (105 boats fishing July 1), the district was closed at 2:00 p.m., July 1 to again provide an opportunity for early fish to enter the escapement.

Beginning July 1 management was characterized by a "test and wait" approach. It was apparent that large numbers of fish were milling in the outer district, they were catchable and an adequate processing fleet was present to handle them. However, until they moved inshore proving they were Ugashik fish, it was possible some may have been destined for other districts. Scale analysis had not yet conclusively indicated the preponderance of age group 4_2 fish expected in the district catch. Escapement was very low in relation to catch, although in comparison to historical timing it was normal. Set net fishermen were upset that they were not sharing in the record catches being made and blamed the lack of inshore fish movement on the drift gill netters whom they accused of "corking off the run". The foremost question confronting management was "when would the fish surge through the district and into the river"? It was felt that if the fishery were closed until such movement occurred, the fishery (based on past years experience), would not be able to stop the surge and a potentially massive escapement was possible. Also any prolonged closure would result in the loss to other districts of some processing capacity, a loss that could prove critical later as the run surged inshore. So the "test and wait" approach seemed the best way to stay on top of the inshore sockeye run progression.

The fishery reopened for 25 hours at 3:00 p.m., July 3 and based on some improvement in escapement at both the counting tower and the inside test fish site, it was subsequently extended another 25 hours (Table 9). Catches over this 50-hour period totaled 513,000 sockeye, and escapement past the tower through July 5 totaled 4,000 fish with an additional 16,000 estimated past the inside test fish site (Tables 12 and 23). Catches at the Ugashik village set net fishery also improved over the above period further indicating some movement of fish into the river was occurring. The increasing escapement indicators were encouraging but not of sufficient magnitude to justify additional fishing time so the district closed again at 5:00 p.m., July 5 to provide additional opportunity for escapement.

Escapement increased at the tower July 6 (daily count of 49,000 fish) bringing the season's accumulative count up to 10% of the desired point goal (Table 18). The tower count data also showed that the inside test fish project was under-forecasting fish numbers passing the test fish sites, because the tower count at this point exceeded the accumulative passage past the test fish sites. With these factors in mind, plus information indicating the July 1 and July 5 district catches were 60-70% age group 4_2 fish (close to preseason district forecast levels), the district was again opened for fishing for 25 hours at 6:00 p.m., July 7 (Table 9).

The 25-hour catch on July 7-8 totaled 454,000 sockeye, which was the largest daily (+ one hour) catch on record for this district. Most of these fish were taken by the drift fleet of 137 boats in the outer bay waters. There were reports however, from several fishermen that just prior to the end of the period (7:00 p.m., July 8) some good catches were made just inside the Ugashik Bay entrance near the "south spit". More complaints from Pilot Point area set netters were registered during this period. They were adamant that the drift fleet was

"corking off the run" causing the lack of set net success in the inner bay. However, the factors contributing to their poor catch rates were primarily the milling tendency of the fish in the outer district, and the lack of any real high tides to push them inshore into the set nets rather than the activities of the drift fishermen.

Based on aerial observations of inner bay set nets (very small catches) and escapement indicators, the fishery was allowed to close at 7:00 p.m., July 8. Fishermen and processors were notified that as the escapement totaled only 77,000 fish past the tower (through 6:00 p.m., July 8), and the catch totaled 1.4 million, further fishing would be delayed until a substantial inshore movement of fish was evident. It came the next day.

Early on July 9 a fisherman phoned in from Pilot Point that "jumpers" were present in good numbers between Dago Creek and Pilot Point. Subsequently two other fishermen and a processor reported similar observations. As a follow-up to these reports an aerial survey was scheduled to assess the "jumper abundance" inside Ugashik Bay. This particular survey was very successful as conditions were optimal for spotting "jumpers" (calm, good light, tide ebbing) and there was numerous "jumper" activity in evidence. Although no subjective estimate of the number of fish moving through the inner bay was attempted, it was apparent that a large surge of fish were "bucking the tide" and moving quickly upriver. Many jumpers were observed from Dago Creek to just below Ugashik village, and they were so abundant that even though the water was muddy brown they would spook when the shadow of the airplane passed over them and the resulting thrashing and large wakes would give their locations away. Approximately one jumper per each 200 yards was observed, and based on this survey the fishery was reopened on short notice at 8:00 p.m., July 9, and did not close again until after the emergency order period expired on July 17 (Table 9).

Inside test fish indices at the Ugashik River test site increased substantially on July 10 indicating the surge of fish was continuing up the Ugashik River (Table 23). Based on this data the fishery was extended another 25 hours. Catches on July 10 were massive, 436,000 sockeye total (the second largest daily catch in the history of the fishery), with most of the drift effort located inside Ugashik Bay proper (Table 12). Both drift and set nets were observed making good catches. Meanwhile, sockeye escapement past the tower through July 10 totaled 128,000 fish (25% of the escapement point goal)(Table 23).

Commercial catches, inside test fish indicators and escapement counts remained high July 11-13, resulting in daily fishery extensions. Tower counts through July 12 totaled 401,000 fish with still more fish entering the river. As the escapement goal was virtually assured, the district was opened from midnight, July 13 until further notice and the 48-hour waiting period for transfers into the district was waived (Table 9). The escapement point goal (500,000 sockeye) was reached at the tower on July 14.

Commercial effort and catches tailed off fairly quickly after July 13 (Table 12). Peak effort occurred July 10 with 259 units of gear fishing, while peak catch rates (22,000 sockeye per hour) occurred July 8 just before the fish surged inshore. Daily catches on five occasions bettered the old single daily catch record of 239,000 fish set in 1981. Escapement counts peaked twice (July 11 and July 14-15) and then dropped substantially (Table 18). Fish continued to pass the tower site however, for a considerable period with the final count amounting to just over 1.0 million fish (Table 23).

An exploitation rate of 77% was exerted on the run by the commercial fishery, and was the highest harvest rate on record for the fishery (33 year average = 57%, range 3 - 77%), but in spite of this escapement goals were still exceeded.

The district catch of other salmon species during 1983 totaled 125,000 fish, 4% of the total district salmon catch (Table 17). The king salmon harvest of 9,000 fish was the second largest on record, exceeded only by the 11,000 fish catch in 1950. The chum salmon catch totaled 108,000 fish, an all time record for the district, bettering the old record of 60,000 set in 1906. The coho salmon catch totaled 8,000 fish and was the seventh largest on record. King and chum salmon escapements were surveyed (aerial and float surveys) by ADF&G and USFWS personnel and yielded the following minimum estimates from the districts' river drainages: kings - 6,000, and chums - 37,000 (Table 20). It appears that adequate escapement occurred for both king and chum salmon. A series of fall coho salmon aerial surveys was planned but were finally cancelled due to continued weather problems.

Twenty four buyers and processors operated in the Ugashik district during the season, four less than during 1982 (Table 28). Two buyers operated during early June targeting on king salmon and two others remained during August for coho salmon, while the remainder were primarily interested in purchasing and processing sockeye. As in recent years, nearly the entire catch was either frozen on floating processors, tendered to other districts or flown to other areas for further processing. With only one reported exception (July 11) processing capacity in the district was able to keep up with the daily catches.

Enforcement in the district was more effective than during recent years, however, numerous complaints were registered by local fishermen regarding violations of closed waters regulations, and persons failing to wait 48 hours after transferring districts.

In retrospect, the season was very successful. The preseason forecast proved to be accurate as the progeny from the 1979 parent escapement returned pretty much as expected. However, a very good return of offspring from the 1978 parent run (1.2 million as opposed to 0.6 million forecast) pushed the

run up to record proportions. Apparently both fresh water and marine survival conditions have remained optimal as evidenced by these returns. With five consecutive escapements (a complete cycle) exceeding 1.0 million fish, the sockeye run to Ugashik district must now be considered very healthy.

Nushagak District

In Nushagak district the preseason inshore sockeye salmon forecast to all river systems totaled 5.8 million, with 3.3 million assigned to Wood River, 640,000 to Igushik River, 1.6 million to Nuyakuk River and 304,000 to Snake and Nushagak-Mulchatna Rivers combined (Table 1). The actual inshore district return of 7.2 million sockeye exceeded the preseason forecast by 25%, and was the sixth consecutive year of outstanding returns (Table 1).

Since 1978, the Nushagak district average sockeye catch has increased to 5.0 million fish, well above the recent long-term (1964-77) average of 836,000, while the total run from 1978-83 has averaged 8.6 million compared with the previous long-term average of 2.2 million (Appendix Table 22). The recent six-year total run average of 8.6 million sockeye is higher than any previous six-year average in the long history of this fishery.

Management of Nushagak's salmon resource is made more difficult by the multi-species aspect of this district's salmon runs, and by the occurrence of more than one major sockeye salmon-producing river system. Nushagak district has accounted for over 71% of Bristol Bay's commercial production of king salmon, and is the only area with a major directed commercial effort aimed at kings. Additionally, this district produces large numbers of chums (53% of the total Bay production), even-year pinks (85% of total) and coho salmon (53% of total).

Nushagak's commercial salmon season is initiated by early arriving king salmon, which normally peak in the fishery between June 16-22. Fishing effort aimed at kings has increased dramatically since 1978 and has averaged over 500 units of drift gear. The expanded level of highly efficient fishing effort has placed Nushagak king stocks under increasing pressure. Early season fishing period closures are often not entirely effective in providing increased escapement rates, as Nushagak kings traditionally "hold" in the district for varying periods of time. Upriver king migration usually is initiated by strong southerly winds, and depending upon stock strength, very significant catch and/or escapement can occur in a very short period of time. Fishing time prior to the emergency order period (9:00 a.m., June 16) is usually conducted 5 days-per-week and is a major management tool used to help gauge early season run strength.

In 1983, the commercial season was closed to fishing on June 15, when the king escapement was judged to be insufficient to allow additional harvest (Table 9). Through June 15 over 67,000 kings had been harvested compared to the long-term average of 31,000 through this date (Table 13). King salmon escapement trends are monitored on a daily basis from Dillingham area subsistence net catches, upriver subsistence catches at Lewis Point, and finally from king escapement index sonar counts on Nushagak River below the village of Portage Creek (Tables 8 and 19). Through the commercial closure on June 15 the indicated king escapement (roughly estimated at "between 5,000 and 8,000") was inadequate, and additional closure would be necessary to improve the catch/escapement ratio.

A lengthy closure of undetermined length was anticipated to improve king salmon escapement trends, and with a "general announcement" (Table 9) to the fishing fleet on the status of the king salmon run and future fishing time,

drift fishing effort began to transfer out of Nushagak to Naknek-Kvichak and Egegik districts. By June 18, 309 drift units had transferred to other districts to begin sockeye salmon fishing operations.

Strong NE 20 to 25 K winds began on June 20, and were expected to improve the king salmon daily escapement trend. An Igushik-only fishing period was considered for June 20, but the relatively low Igushik River sockeye forecast and lack of significant strength past the lower river test fish site, and the strong NE winds, which would push kings into the Igushik section prompted a decision to keep the entire district closed (Table 25).

Of further concern was the lack of age 5_2 king salmon in the commercial catch. Normally, age 5_2 fish make up an average (1958-82) of about 31%, but through the fishery closure on June 15, only 10% of the catch were age 5_2, suggesting that the large 1978 brood year escapement was producing very poorly. If the 5_2 age component was weak, the total king run could be considerably less than expected, and as a result, a cautious management stance was adopted.

By June 22, the Igushik River test fish daily sockeye index catch had improved considerably, and both Dillingham area subsistence king catches (10-17 kings per net per tide) and upriver Lewis Point subsistence catches (5 to 46 kings per net) were showing good escapement was occurring (Tables 9 and 25). A 12-hour fishing period for Igushik section only was announced for June 23 based on the need to assess early-season sockeye run strength to the Igushik River system (Table 9). The Nushagak section remained closed to maximize king escapement, which was now roughly estimated at about 30,000 fish through June 22. The continued poor showing of age 5_2 kings in subsistence catches indicated that the 1978 brood year was indeed weak, and that total run strength might be well under that expected.

The 12-hour Igushik section only period on June 23 produced over 44,000 sockeye, the largest Igushik section catch ever achieved through this date

(Table 13). The strong early-season Igushik sockeye catch, and indicated escapement past the lower river test site of 39,000 through June 22 (20% of the escapement goal) suggested an early strong run was in progress (Tables 13 and 25).

Subsistence catches continued to show good upriver king salmon passage rates (Table 8), and a single subsistence net at Nushagak Point, on the east side of the upper district, caught 76 kings on the 2:00 a.m. tide on June 23, indicating that the continued closure of the Nushagak section was achieving its objective of protecting king stocks as they moved through the district.

The Igushik River test fishing indices continued to show high sockeye passage rates past the lower site, and through June 24 suggested that 140,000 fish (70% of the escapement goal) had entered the river (Table 25). Even though it was now suspected that fish were "flushing" in and out past the test net site, inflating the escapement estimate, a second period was announced for Igushik section to begin at 12:00 noon, June 25 for 24 hours duration, followed by a 12-hour Nushagak section opening from 12:00 midnight to 12:00 noon, June 26 (Table 9).

The split opening option for the Nushagak district was selected to provide an additional 12 hours protection to migrating king salmon stocks, and to provide the opportunity for fishermen to harvest Igushik River sockeye, which were showing unusual early season strength (Tables 9 and 25). There was some question about the validity of Igushik River sockeye escapement estimates produced by the test fish project, but even if the lower range of 35,000 was selected as more indicative of actual escapement, the rate was still well ahead of the accumulative curve needed to obtain the goal, and age composition of the commercial catch off Igushik beach was closely following the forecast (Table 25).

The first 12 hours of the Igushik opening produced a disappointing sockeye catch by about 60% (300 drift boats) of the potential fleet, and the

total 24-hour sockeye catch amounted to only 23,000 fish (Table 13). The Nushagak section, however, produced over 414,000 sockeye, with the majority of the catch coming from the outer district (Table 13).

Particularly gratifying was the observation of one major company whose tenders were averaging 17% kings delivered by fishermen in the upper district compared to 5% kings in the outer district. King salmon distribution in the catch indicated that the kings were in the upper district when the fishery opened. Almost 29,000 kings (as well as 69,000 chums) were harvested in the 12-hour period on June 26, and subsistence net king catches at Lewis Point on the same date indicated a significant escapement was occurring concurrent with the fishery (Table 9).

The 414,000 sockeye caught on June 26 exceeded the previous record catch by this date by a factor of three, suggesting an incoming run of exceptional strength, while age analysis was virtually identical to the district forecast.

A second 12-hour period was announced for June 28 based on: (1) the strong show of sockeye in the commercial catch on June 26; (2) an increasing sockeye escapement rate into Wood River, where over 100,000 fish were expected through June 27 (Table 24); and (3) most importantly, the need to crop the front end of a sockeye run that appeared to be extremely strong.

The 12-hour period on June 28 produced another 1/2 million catch (479,000 sockeye, 6,000 kings and 69,000 chums) from peak fishing effort estimated at 584 drift units and 230 set net units (Table 13). Age composition of the sockeye catch continued to track closely with that expected, while both escapement rates into Wood River and past the sonar unit in Nushagak River (primarily Nuyakuk River sockeye) began to decrease significantly due to the heavy fishing success on June 26 and 28 (Tables 18 and 19).

With Wood River showing an escapement of 168,000 (17% of the goal) through June 29, and Nushagak sonar and Nuyakuk tower indicating not over 50,000 sockeye through the same date, the fishery remained closed (Tables 18 and 19). Concern at this point in time was that 60% to 70% of the total sockeye catch of 962,000 to date were estimated to be of Nuyakuk River origin (Table 13). If inseason proration estimates were reasonably correct, between 600 and 700,000 sockeye of Nuyakuk River origin had already been harvested from a total forecast of 1.6 million (Table 1). Further, continued age analysis of samples collected from the end of the June 28 period, showed a definite reduction of age 5_2 sockeye, and virtually all of Nuyakuk's run (77%) were forecast to be age 5_2 fish (Table 3).

With the commercial fishery capable of harvesting form 1/2 to 3/4 million fish in a 12-hour period, and with up to 1/2 of the Nuyakuk River sockeye forecasted run already accounted for (assuming catch proration was correct), extreme care would be needed to insure escapement requirements into Nuyakuk River.

The Nushagak district outside test vessel was dispatched on the first of several consecutive test fishing trips on June 29 to test for incoming sockeye strength, and especially to help determine and define inner district fish movement and apparent run magnitude (Table 7).

The Nushagak test fishing vessel was fished continuously from June 29 through the evening flood tide on July 2 with only 12-hour downtime layovers between fishing trips. Four successive fishing trips were conducted, which confirmed that a significant body of fish were milling and holding within the mid-district (Table 7). This body of fish "held" in the district until the morning flood tide on July 2, when the test vessel catches and aerial survey "jumper index" counts indicated a significant buildup in the Clarks Point/Ekuk Bluff area (Table 7). The evening flood tide test fishing catch

indices on July 2, indicated a sizable, strong body of fish had begun to move past the inside fishing district boundary and into the rivers (Table 7). With this knowledge, a 12-hour fishing period was announced on short notice for the morning of July 3 (Table 9). It was immediately apparent from the sockeye catch test indices obtained on the evening flood tide of July 2 that a very significant escapement was taking place, and to wait for confirmation would risk serious under-harvest of the run. Since the fishing fleet had been "put on notice" of an imminent fishing period at 12:00 noon on July 2, the short notice announcement was not unanticipated (Table 9).

Aerial escapement surveys of Wood River on July 3 showed heavy fish activity in the lower river area on the early morning flight, and aerial river estimates of 172,000 and 292,000, respectively, on later flights that day (Table 24). An aerial survey of Nushagak River below the sonar site showed no less than 100,000 fish in clear water with heavy fish activity in the lower river (Table 25).

With the rapidly increasing escapement rates into Wood and Nushagak Rivers, the fishing period was extended for 15 hours through 9:00 a.m., July 4. However, by 6:00 p.m. on July 3, the Wood River tower escapement count had reached 350,000 with no less than 292,000 additional fish in clear water below the counting tower (64% of the escapement goal), consequently the entire district was extended for 24 hours through 9:00 a.m., July 5 (Table 9).

Along with the strong escapement trends, the commercial fishery was showing continued strength with 810,000 sockeye caught on July 3 and 472,000 caught on July 4 (catches eventually averaged 481,000 sockeye from July 3 through July 8)(Table 13).

Through the afternoon of July 4, the Wood River escapement goal was achieved (1.030 million), and a Nushagak River aerial survey indicated that

the Nuyakuk River sockeye escapement goal was apparently met when almost 450,000 sockeye, king and chum salmon were observed below and just above the sonar site (Table 26). King and chums were estimated to account for 10-20% of the survey estimate, leaving 370 to 410,000 sockeye destined for the Nuyakuk and Nushagak-Mulchatna River systems. The Igushik River sockeye run was also indicating enough strength to achieve escapement requirements (Tables 24-26). The ongoing fishing period was subsequently extended until further notice and the 48-hour waiting period was waived for transfers into the district (Table 9).

The holding pattern and sudden movement of sockeye in 1983 allowed a close look at migration timing patterns this season:

1. sockeye moved from the inside district boundary on July 2 to Wood River tower in 18 hours;
2. the same block of fish movement that commenced on July 2 reached the sonar site on Nushagak River 24 hours after the Wood River escapement rate began to accelerate, and total passage from the fishery to the sonar site was about 42 hours;
3. peak of the sockeye run in Nushagak district was July 2-3, with a 6 to 7 day passage rate from the fishery to Nuyakuk tower for June 26 and 28 fishing periods, and 5 to 6 days for the July 3 period;
4. all fish movement averaged about two days from the fishery to reach the Nushagak River sonar site; and
5. a 4-5 day passage rate was suggested from the Igushik River test fish site to the counting tower.

The unusual holding pattern was thought to be a result of warmer than normal water temperatures, and especially to the very low discharge of water volume due to lack of snow-pack and low spring rainfall. River discharge of all Nushagak district rivers was well below normal, and fish migration patterns

were abnormal once the fish did enter the rivers. Wood River sockeye wandered throughout the width of the river at all tide stages, especially in the lower river, making aerial survey estimates of fish abundance difficult. At the Nushagak River sonar site the effect was the opposite, with fish migrating so close to shore that the narrow inshore sonar beam was missing many fish.

Continued daily assessment of the Igushik River sockeye run indicated that escapement requirements would be met (just barely). By the end of the season all of Nushagak district's major sockeye river systems had reached, or exceeded, escapement requirements: Wood - 1.361 million compard with a goal of 1.0 million; Igushik - 180,000 with a goal of 200,000; and Nuyakuk - 319,000 with a goal of 300,000 (Table 1). Sockeye escapements were achieved in both Nuyakuk and Nushagak-Mulchatna River systems, as well as Wood River, on the single surge of fish which the test fishing vessel picked up on July 2. The district test fish program was instrumental this season in defining fish movements within the upper district, and in obtaining escapement goals, especially in the Nuyakuk River system.

The final sockeye salmon catch of 5.3 million and escapement of 1.9 million equaled a total run of 7.2 million, the fourth largest run in the past 46 years (Table 4). Sockeye total runs to the Igushik River system amounted to 678,000 compared with the forecast of 640,000, while the Nuyakuk system actual return of 1.572 million was also virtually identical to the forecast of 1.586 million (Table 1 and Figure 2). The Wood River total sockeye return totaled 4.5 million compared to the forecast of 3.3 million, was the sixth consecutive year in which total runs have exceeded 3.5 million fish, and is the only major Nushagak sockeye producing river system which continues to show increasing production (Appendix Table 23 and Figure 2).

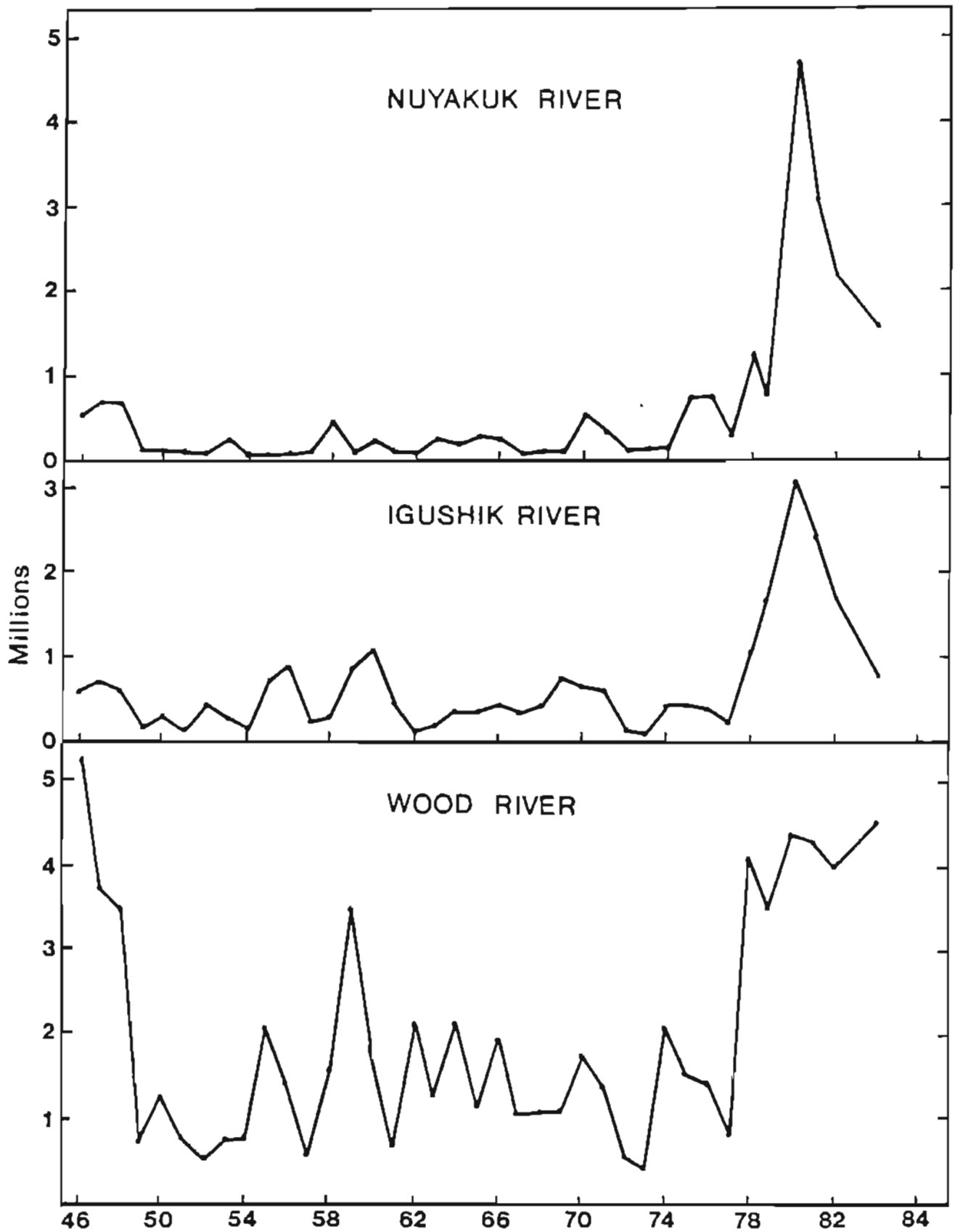

Figure 2. Total inshore return of sockeye salmon by major river system, Nushagak district, Bristol Bay, 1946-83.

The commercial harvest of 6.1 million salmon of all species in Nushagak district in 1983 was the fifth largest for this fishery since 1964, and almost two times higher than the 20-year average of 3.4 million fish (Appendix Table 15).

Nushagak king salmon accounted for 139,000 of the district harvest, while the escapement of 162,000 was the largest on record, exceeding the previous highest of 150,000 in 1981 (Appendix Table 41). The king return in 1983 equaled a total run of 301,000, well above the average run of 174,000 since 1966 (Appendix Table 41).

The Nushagak chum salmon catch of 586,000 was equal to the past 10-year average of 562,000 for this district, while the chum escapement of 164,000 equaled a total run of 750,000 compared to the long-term average total run of 702,000 (Appendix Tables 12 and 42).

Nushagak district's coho salmon catch of 81,000 was below the recent 10-year average of 109,000, while the escapement of about 80,000 (sonar and aerial survey estimate) was deemed adequate. Increased late season fishing effort commenced in 1977 and coho catches since that time have reflected the expanded attention (Appendix Table 14). Coho escapements to this district have yet to be fully evaluated, but the Nushagak sonar unit has demonstrated that cohos can be enumerated by this means. In 1983, sonar derived coho escapement in Nushagak River was estimated at 34,000 fish through August 17 (Table 19).

Processing effort decreased in 1983 when 28 processors and buyers operated in Nushagak district compared with 36 in 1981 and 41 in 1982 (Table 28). In addition to the three major long established shore-based canneries, floating freezer ship operations totaled 16, compared to 23 in 1982, while airlifted salmon operations also decreased from 15 in 1981-82 to 11 in 1983 (Table 28).

Togiak District

The 1983 sockeye salmon forecast for the Togiak district was 589,000 fish, well above the 20-year average total return of 487,000 to this district (Appendix Table 24). With an escapement goal of 100,000 fish for Togiak Lake, a liberal management approach was necessary this season to harvest the large potential surplus. Togiak district is managed differently than other areas of Bristol Bay and has a fixed fishing schedule of four days-per-week in the Togiak section and five days-per-week in Kulukak, Osviak, Matogak and Cape Peirce sections. This fishing schedule is adjusted by emergency order, as needed, to achieve desired escapements.

On the average Togiak district contributes less than 3% of the total Bristol Bay sockeye catch, but it is an important producer of other species of salmon. Over the last 20 years Togiak has averaged 18% of the kings, 20% of the chums and 30% of all cohos landed in Bristol Bay (Appendix Tables 11-12 and 14). Effort levels at Togiak have increased steadily since 1974 and reached approximately 150 drift units and 40 set net units in 1983 (Table 15). In recent years a large number of vessels have transferred to Togiak in mid-July to take advantage of the somewhat later sockeye peak in this district. In 1983, 89 vessels transferred to Togiak before the end of the emergency order period on July 17. Additional vessels also moved to Togiak in early August to participate in the coho fishery.

An early price settlement this season allowed for an uninterrupted harvest on the regular fishing schedule. Two brief suspensions by one major company on July 7-8 had little effect in reducing the overall catch and other processors were able to accommodate the overflow. In past years production capacity has been a serious limiting factor in the ability to harvest the resource, but a total of 12 operators purchased salmon at Togiak in 1983 and at no time did the fishermen have serious difficulty with a lack of markets.

By the week of July 11-15, it was clear that a strong sockeye run was in progress, and fishing time was extended through the regular weekend closure (Tables 9 and 15). Fishing was extended again the following weekend and sockeye catches remained strong until July 28 (Table 15). The final sockeye catch of 584,000 was the third largest recorded in this district, and the escapement of 240,000 was over 18% higher than the long-term average of 202,000 (Appendix Table 24). The king salmon catch of 38,000 and escapement of 22,000 was the second largest total run documented in this district for that species (Appendix Table 41). The chum salmon harvest of 323,000 broke the all time catch record for this species and the escapement was estimated at 165,000 (Appendix Table 42).

The coho salmon run at Togiak was very weak in 1983 and the harvest of only 6,000 fish was the lowest reported since 1971 (Appendix Table 14). The commercial fishery was closed by emergency order on September 5 and not reopened for the balance of the season. Coho escapement was also poor, and was estimated at between 8 and 15,000 based on past run timing, catches, aerial surveys and the new weir operation on the Gechiak River, a major tributary. Minimal aerial surveillance was conducted this season due to the extremely poor weather conditions. It has been suggested that the poor run in 1983 may have resulted from brood year competition and cannibalism in the freshwater streams by the large coho year class that preceded this season's return. Virtually all coho salmon in Bristol Bay spend two winters in the freshwater environment, and the coho fingerlings of large successful escapements often directly compete with the following year's freshwater fry population.

1983 SUBSISTENCE SALMON FISHERY

Historically, large numbers of salmon were harvested in Bristol Bay for feeding dog teams. This practice was greatly reduced with the introduction of the snow machine, but is recently increasing with the renewed interest in dog racing and sport mushing. Records of the subsistence removal in Bristol Bay's major river systems have been kept by the Department since 1963 when a permit system was initiated.

Subsistence catches of salmon in Bristol Bay normally range between 100-200,000 fish and have gradually increased in recent years (Appendix Table 56). Local population increases, better reporting and yearly influx of non-watershed participants have contributed to this increase. Competition for resources and limited available fishing space has resulted in regulations in the Naknek River and Iliamna-Lake Clark drainages restricting salmon subsistence fishing to only those persons domiciled in those areas.

In 1982 a personal use fishery was allowed for the first time in Bristol Bay. It gave non-traditional subsistence users and non-watershed residents the opportunity to harvest salmon in times of surplus. The personal use fishery is only allowed on the Naknek River drainage and only when the upper end of the sockeye escapement range (900,000) has been reached. During the 1983 season only one personal use permit was issued and the harvest was minimal.

Subsistence fishermen in Bristol Bay harvested 181,000 salmon in 1983 (Table 33 and Appendix Table 56). The harvest in 1983 exceeds the long-term Bristol Bay average of 149,000 since 1964 (Appendix Table 56). Due to large salmon escapements in all of the major river systems of Bristol Bay, subsistence fishermen were reportedly able to satisfy their requirements without difficulty.

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TABLES

Table 1. Inshore run of sockeye salmon compared with the preseason forecast, escapement goals and forecast commercial catch, by river system and district, Bristol Bay, 1983.

District and River System	Number of Fish in Thousands									
	Inshore Forecast			Escapement[2]				Inshore Catch[2]		
	Forecast[1]	Actual	Run/Fore.	Goal	Range	Actual	Esc/ Goal	Forecast	Actual	Catch/ Fore.
NAKNEK-KVICHAK DISTRICT										
Kvichak River[3]	9,738	19,922	2.05	2,000	1,500-2,500	3,570	1.79	7,738	16,352	2.11
Branch River[3]	468	552	1.18	185	170- 200	96	0.52	283	456	1.61
Naknek River	2,944	5,395	1.83	800	700- 900	888	1.11	2,144	4,506	2.10
Total[4]	13,150	25,869	1.97	2,985	2,370-3,600	4,554	1.53	10,165	21,314	2.10
EGEGIK DISTRICT	3,415	7,533	2.21	600	500- 700	792	1.32	2,815	6,740	2.39
UGASHIK DISTRICT	4,177	4,343	1.04	500	400- 600	1,001[5]	2.00	3,677	3,342	0.91
NUSHAGAK DISTRICT										
Wood River	3,256	4,547	1.40	1,000	800-1,200	1,361	1.36	2,256	3,186	1.41
Igushik River[3]	640	678	1.06	200	150- 250	180	0.90	440	497	1.13
Nuyakuk River[3]	1,586	1,572	0.99	300	250- 350	319	1.06	1,286	1,253	0.97
Nushagak-Mul. Sys.[3]	263	436	1.66	50	40- 60	85	1.70	213	351	1.65
Snake River[3]	41	12	0.29	40	30- 50	3	0.08	1	9	9.00
Total[4]	5,786	7,245	1.25	1,590	1,270-1,910	1,948	1.23	4,196	5,296	1.26
TOGIAK DISTRICT	589	824	1.40	100	80- 120	240[6]	2.40	489	584	1.19
TOTAL BRISTOL BAY[4]	27,117	45,813	1.69	5,775	4,620-6,930	8,536	1.48	21,342	37,277	1.75

1/ Final Bristol Bay sockeye salmon forecast of inshore run for 1983.
2/ Escapement data is final, while catch data is preliminary.
3/ These systems cannot be managed separately from the major system in the district. Consequently, the exploitation rates are merely the catch rates anticipated for the major system in the district; the corresponding escapement goals do not necessarily coincide with the escapement levels which would be achieved if these systems could be managed independently.
4/ Due to rounding, the totals may not equal the sum of the district totals.
5/ Including sockeye run to Mother Goose system.
6/ Including sockeye runs to the various tributaries and minor river systems of Togiak district.

Table 2. Inshore forecast of sockeye salmon age class return by river system and district, Bristol Bay, 1983.

District and River System	Number of Fish in Thousands: Age Class (Brood Year) 4_2(1979)	5_3(1978)	2-Ocean	5_2(1978)	6_3(1977)	3-Ocean	Total
NAKNEK-KVICHAK DISTRICT							
Kvichak River	6,616	1,786	8,402	962	374	1,336	9,738
Branch River	176	97	273	150	45	195	468
Naknek River	511	780	1,291	949	704	1,653	2,944
Total	7,303	2,663	9,966	2,061	1,123	3,184	13,150
EGEGIK DISTRICT	666	1,342	2,008	433	974	1,407	3,415
UGASHIK DISTRICT	3,305	424	3,729	215	233	448	4,177
NUSHAGAK DISTRICT							
Wood River	1,647	616	2,263	899	94	993	3,256
Igushik River	153	57	210	299	131	430	640
Nuyakuk River	216	81	297	1,205	84	1,289	1,586
Nush.-Mulch. Sys.	85		85	160	18	178	263
Snake River	13	8	21	17	3	20	41
Total	2,114	762	2,876	2,580	330	2,910	5,786
TOGIAK DISTRICT	172	71	243	302	44	346	589
TOTAL BRISTOL BAY[1/]	13,560	5,262	18,822	5,591	2,704	8,295	27,117

1/ Sockeye salmon of several minor age classes are expected to contribute an additional 1-2% to the total return.

Table 3. Inshore run of sockeye salmon by age class, river system and district, Bristol Bay, 1983. 1/

District and River System		Number of Fish in Thousands by Age Class						
		4_2	5_3	2-Ocean	5_2	6_3	3-Ocean	Total
NAKNEK-KVICHAK DISTRICT								
Kvichak River								
	Number	17,448	1,230	18,678	1,078	88	1,166	19,844
	Percent	87.9	6.2	94.1	5.4	0.4	5.9	100.0
Branch River								
	Number	436	37	473	63	8	71	544
	Percent	80.1	6.8	86.9	11.6	1.5	13.1	100.0
Naknek River								
	Number	2,319	1,047	3,366	1,579	356	1,935	5,301
	Percent	43.7	19.8	63.5	29.8	6.7	36.5	100.0
Total	Number	20,203	2,314	22,517	2,720	452	3,172	25,689
	Percent	78.6	9.0	87.7	10.6	1.8	12.3	100.0
EGEGIK DISTRICT								
	Number	681	5,713	6,394	480	585	1,065	7,459
	Percent	9.1	76.6	85.7	6.4	7.8	14.3	100.0
UGASHIK DISTRICT								
	Number	2,949	811	3,760	389	167	556	4,316
	Percent	68.3	18.8	87.1	9.0	3.9	12.9	100.0
NUSHAGAK DISTRICT								
Wood River								
	Number	2,805	583	3,388	1,144	13	1,157	4,545
	Percent	61.7	12.8	74.5	25.2	0.3	25.5	100.0
Igushik River								
	Number	319	67	386	279	4	283	669
	Percent	47.7	10.0	57.7	41.7	0.6	42.3	100.0
Nuyakuk River								
	Number	377	12	389	1,034	30	1,064	1,453
	Percent	25.9	0.8	26.8	71.2	2.1	73.2	100.0
Nushagak-Mulchatna								
	Number	109	3	112	236	5	241	353
	Percent	30.9	0.8	31.7	66.9	1.4	68.3	100.0
Snake River								
	Number	4	2	6	5	1	6	12
	Percent	33.3	16.7	50.0	41.7	8.3	50.0	100.0
Total	Number	3,614	667	4,281	2,698	53	2,751	7,032
	Percent	51.4	9.5	60.9	38.4	0.8	39.1	100.0
TOGIAK DISTRICT								
	Number	269	67	336	436	12	448	784
	Percent	34.3	8.5	42.9	55.6	1.5	57.1	100.0
TOTAL BRISTOL BAY								
	Number	27,716	9,572	37,288	6,723	1,269	7,992	45,280 2/
	Percent	61.2	21.1	82.3	14.8	2.8	17.7	100.0

1/ The inshore run data does not include the 1983 Japanese high seas catch of maturing Bristol Bay sockeye or the 1982 Japanese catch of immatures.

2/ Approximately 533,000 additional sockeye salmon of several minor age classes returning in 1983 are not included in this total.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, 1983. 1/

District and River System	Number of Fish		
	Catch	Escapement	Total Run
NAKNEK-KVICHAK DISTRICT			
Kvichak River	16,352,189	3,569,982	19,922,171
Branch River	455,757	96,220	551,977
Naknek River	4,506,381	888,294	5,394,675
Total	21,314,327	4,554,496	25,868,823
EGEGIK DISTRICT	6,740,310	792,282	7,532,592
UGASHIK DISTRICT			
Ugashik River		1,000,614	
Mother Goose System		750	
Total	3,341,978	1,001,364	4,343,342
NUSHAGAK DISTRICT			
Wood River	3,185,969	1,360,968	4,546,937
Igushik River	497,311	180,438	677,749
Nuyakuk River	1,253,165	318,606	1,571,771
Nushagak-Mul. Sys.	350,613	85,400	436,013
Snake River	9,264	3,080	12,344
Total	5,296,322	1,948,492	7,244,814
TOGIAK DISTRICT			
Togiak Lake		191,520	
Togiak River and Tributaries		13,200	
Kulukak System		26,970	
Other Systems		7,920	
Total	584,092	239,610	823,702
TOTAL BRISTOL BAY	37,277,029	8,536,244	45,813,273

1/ Inshore catch and apportionment by river system to the Naknek-Kvichak and Nushagak districts is preliminary, while escapements are final.

Table 5. Offshore test fishing catch indices and estimated inshore daily passage rate of sockeye salmon, Port Moller, Bristol Bay, 1983. 1/

Date	No. of Stations Fished	Sockeye Catch	Running Mean Weight (lbs.)	Running Mean Length (mm)	Sockeye Salmon Index 2/ Daily	Sockeye Salmon Index 2/ Accum.	Sockeye Salmon Passage Rate 3/ Daily	Sockeye Salmon Passage Rate 3/ Accum.	Days Lag
6/ 9	5	10	5.9	528	5	5	232	232	
10	5	10	6.1	531	5	10	227	459	
11	6	21	5.7	523	11	22	511	970	
12	5	19	5.7	521	9	31	418	1,389	
13	6	25	5.9	527	13	43	566	1,955	
14	5	17	5.9	527	9	52	388	2,343	
15	2	(20)	5.9	527	(20)	72	23	2,366	
16	5	65	5.9	529	31	102	1,430	3,891	
17	6	9	5.9	529	5	107	231	4,196	
18	5	57	5.9	529	29	135	1,345	5,495	
19	3	(20)	5.9	528	(13)	148	449	6,102	
20	0	(13)	5.9	528	(14)	162	652	7,692	
21	6	27	5.9	529	15	177	690	8,382	
22	5	74	5.8	527	37	214	1,846	10,645	
23	0	(33)	5.8	527	(33)	247	1,714	12,705	
24	5	55	5.8	527	30	277	1,520	14,225	
25	6	8	5.8	527	4	281	222	14,404	
26	2	82	5.8	527	39	320	2,007	16,509	
27	6	26	5.8	527	14	334	728	16,992	
28	5	60	5.8	528	32	366	1,583	18,189	
29	4	23	5.8	528	11	377	555	18,618	
30	5	103	5.7	527	52	429	2,594	21,469	
7/ 1	6	37	5.7	527	20	449	975	22,392	7
2	5	89	5.7	527	47	496	2,442	25,881	7
3	6	45	5.7	527	25	520	1,410	29,918	7
4	5	80	5.7	527	43	563	2,837	36,854	7
5	2	(37)	5.7	528	(32)	596	437	37,148	7
6	0	(22)	5.7	528	(22)	618	0	37,148	7
7	6	21	5.7	528	12	630	753	36,798	6
8	4	26	5.7	528	15	645	927	39,054	6
Total	131	1,134	5.7	528		645		39,054	

1/ Passage rates are those actually used inseason and adjusted daily as required.
2/ Indices expressed in fish/100 fathom hours and includes interpolations for missed days (in brackets) and stations.
3/ Estimated passage rate is expressed in thousands of fish and is adjusted throughout the season based on catchability and/or lag time.

Table 6. Offshore test fishing catch indices and estimated inshore daily passage rate of chum salmon, Port Moller, Bristol Bay, 1983.

Date	No. of Stations Fished	Chum Catch	Chum Salmon Index[1/] Daily	Chum Salmon Index[1/] Accumulative	Chum Salmon Passage Rate[2/] Daily	Chum Salmon Passage Rate[2/] Accumulative
6/ 9	5					
10	5	2	1	1	10	10
11	6	3	2	3	15	25
12	5	3	1	4	14	40
13	6	2	1	5	10	50
14	5	1	+	6	5	55
15	2	(2)	(2)	8	21	75
16	5	10	4	11	36	112
17	6	2	1	12	11	122
18	5	8	4	16	40	162
19	3	(1)	(1)	17	7	169
20	0	(1)	(1)	18	12	180
21	6	3	2	20	16	197
22	5	5	3	22	27	224
23	0	(1)	(2)	24	19	243
24	5	2	1	25	11	253
25	6			25		253
26	2	3	1	27	14	267
27	6	1	1	27	5	272
28	5	6	3	31	33	305
29	4	4	2	33	20	325
30	5	5	3	35	26	351
7/ 1	6	7	4	39	36	387
2	5	2	1	40	10	397
3	6	5	3	43	27	424
4	5	14	8	50	75	499
5	2			50		499
6	0			50		499
7	6	6	3	54	34	533
8	4	1	1	54	6	538
Total	131	100		54		538

1/ Indices expressed in fish/100 fathom hours and includes interpolations for missed days (in brackets) and stations.

2/ Estimated passage rate is expressed in thousands of fish, and is based on the historical average of 9,954 fish per adjusted index point (1979 not used in compilating average).

Table 7. Summary of outside sockeye salmon test fishing indices in the Nushagak district by index area and date, Bristol Bay, 1983. 1/

Index Area	Date						
	June 29	June 30		July 1		July 2	
	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
Nushagak River							19,600
Wood River							
Kanakanak Beach	133		40		0	0	229
Grassy Island	600		72		0	125 2/	30,000
Nushagak Point	3,154	60	155	0	97	930 3/	41,400
Coffee Point		0					
Combine Flats	3,397		320	27 2/	345		
Clarks Point	1,307		76		1,340 2/	4,982	
Ekuk Bluff	480	0	0		913 2/	2,412	
Schooner Channel, N.W.				20			
Schooner Channel, S.E.							
Ships Channel, N.W.		0	1,593	405			
Ships Channel, S.E.							
Middle Channel, N.W.		1,190		343			
Middle Channel, S.E.							
West Channel, N.W.		394		120			
West Channel, S.E.							
Dead Man's Spit							
Nichols Spit							

1/ All indices expressed in number of fish/100 fathom hours to the nearest full index point.

2/ Average of two consecutive drifts in the same index area.

3/ Average of four consecutive drifts in the same index area.

Table 8. Daily king salmon catch per unit of effort in subsistence nets at Kanakanak Beach and Lewis Point, Nushagak district, 1983.

Date[1]	Wind[2] Direction	Wind[2] Knots	Catch Per Unit of Effort[3] Kanakanak Beach CPUE	Kanakanak Beach Effort[4]	Lewis Point CPUE	Lewis Point Effort[5]
5/28			0.2	22		
28			0	22		
29			3.0	22		
29			2.6	22		
30			6.8	22		
30			2.4	22		
31	S	10-15	0.1	22		
31	S	0- 5	0.2	22		
6/ 1	NE	5-10	0.1	23	1.0	1
1	NE	5-10	0	22	0	1
2	NE	0- 5	0	21	0	1
2	Calm		0	21	0	1
3	NW	0- 5	0	20	0	1
3	NW	5-10	0	20	0	1
4	SW	5-10	0.1	22	0	1
5	SW	0- 3	0.1	22	2.0	2
5	SW	5-10	0	22	0	2
6	SW	0- 3	0	21	0	4
6	SW	0- 3	0	22	0	4
7	NE	0- 5	0	23	0	4
8	NE	0- 5	+	25	0	4
8	NE	0- 3	0	22	0	4
9	NE	0- 3	0	26	0.5	4
9	NE	5-10	0	25	0	4
10	E	0- 5	0	24	0.8	4
10	S	0- 5	0	24	0	4
11	S	0- 3	0	20	0	6
11	S	0- 5	0	24	0	7
12	NE	5-10	0	21	0.3	7
12	E	0- 5	0	23	0	7
13	NE	5-10	0	24	0	8
13	E	0- 3	0	22	0	8
14	NE	10-15	0	23	0	7
14	NE	5-10	0	26	0	7
15	E	0- 3	0	25	0.1	7
15	E	0- 3	0	24	0	7
16					0	7
16					0	7
17					0.1	7
17	SW	0- 5	0.7	3		
18					0	7
18					1.1	7

(continued)

Table 8. (continued)

Date[1]	Wind[2] Direction	Wind[2] Knots	Catch Per Unit of Effort[3] Kanakanak Beach CPUE	Kanakanak Beach Effort[4]	Lewis Point CPUE	Lewis Point Effort[5]
6/19					0.9	7
19					0.9	7
20					3.0	7
20	NE	20-25	17.0	9	16.6	7
21					45.9	5
21	NE	10-15	9.7	24	9.9	5
22					22.8	4
22	NE	0- 5	1.5	15	4.5	4
23	NE	5-10	0.3	20	14.0	2
23						
24					42.7	3
24	NE	15-20	4.8	23		
25	NE	5-10	2.8	20	0.5	2
25						
26					36.8	4
26						
27	NE	15-20	1.0	1		
27	NE	5-10	4.2	20		
28					4.0	1
Season Average CPUE and Effort			1.3	21	4.8	5

1/ Catches recorded at low water when nets are picked.

2/ As recorded on Kanakanak Beach at time of survey.

3/ Average number of kings per net (CPUE) at Kanakanak Beach in Dillingham, and at the lower fish camp location at Lewis Point on Nushagak River.

4/ Total subsistence nets fishing on Kanakanak Beach.

5/ Subsistence nets selected as "index nets" and monitored for CPUE.

Table 9. Emergency order commercial salmon fishing periods, Commissioner's announcements, and general announcements, by district, Bristol Bay, 1983.

I. Emergency Orders[1] Number	Date and Time			Hours/Days Open
NAKNEK-KVICHAK DISTRICT				
AKN 02	June 27	11:00 p.m. to June 28	11:00 a.m.	12 hrs.
AKN 04	June 29	2:00 p.m. to June 30	2:00 a.m.	12 hrs.
AKN 07	June 30	2:00 a.m. to June 30	2:00 p.m.	12 hrs.
AKN 09	June 30	2:00 p.m. to July 1	2:00 p.m.	24 hrs.
AKN 12	July 1	2:00 p.m. to July 17	9:00 a.m.	15 days, 19 hrs.
AKN 16	July 6	5:00 p.m. to July 7	7:00 a.m.	14 hrs.[2]
Naknek Section Only				
AKN 18	July 9	7:00 p.m. to July 10	11:00 p.m.	28 hrs.[2]
AKN 20	July 10	11:00 p.m. to July 11	11:00 p.m.	24 hrs.[2]
EGEGIK DISTRICT				
AKN 01	June 26	10:00 p.m. to June 27	12:00 N	14 hrs.
AKN 03	June 28	12:00 N to June 28	12:00 MN	12 hrs.
AKN 05	June 28	12:00 MN to June 29	12:00 MN	24 hrs.
AKN 08	June 29	12:00 MN to July 1	1:00 a.m.	25 hrs.
AKN 11	July 1	1:00 a.m. to July 2	1:00 a.m.	24 hrs.
AKN 13	July 1	6:00 p.m. to July 17	9:00 a.m.	15 days, 15 hrs.
UGASHIK DISTRICT				
AKN 01	June 26	10:00 p.m. to June 27	12:00 N	14 hrs.
AKN 06	June 29	1:00 p.m. to June 30	2:00 p.m.	25 hrs.
AKN 10	June 30	2:00 p.m. to July 1	2:00 p.m.	24 hrs.
AKN 14	July 3	3:00 p.m. to July 4	4:00 p.m.	25 hrs.
AKN 15	July 4	4:00 p.m. to July 5	5:00 p.m.	25 hrs.
AKN 17	July 7	6:00 p.m. to July 8	7:00 p.m.	25 hrs.
AKN 19	July 9	8:00 p.m. to July 10	9:00 p.m.	25 hrs.
AKN 21	July 10	9:00 p.m. to July 11	10:00 p.m.	25 hrs.
AKN 22	July 11	10:00 p.m. to July 12	11:00 p.m.	25 hrs.
AKN 23	July 12	11:00 p.m. to July 13	12:00 MN	25 hrs.
AKN 24	July 13	12:00 MN to July 17	9:00 a.m.	4 days, 9 hrs.
AKN 25	July 17	9:00 a.m. to July 18	9:00 a.m.	24 hrs.
NUSHAGAK DISTRICT				
DLG 01	June 15	9:00 a.m. to June 16	9:00 a.m.	24 hrs.[2]
DLG 04	June 28	3:00 a.m. to June 28	3:00 p.m.	12 hrs.
DLG 05	July 3	6:00 a.m. to July 3	6:00 p.m.	12 hrs.
DLG 06	July 3	6:00 p.m. to July 4	9:00 a.m.	15 hrs.
DLG 07	July 4	9:00 a.m. to July 5	9:00 a.m.	24 hrs.
DLG 08	July 5	9:00 a.m. to July 18	9:00 a.m.	13 days

(continued)

Table 9. (continued)

I. Emergency Orders[1] Number	Date and Time	Hours/Days Open
NUSHAGAK DISTRICT (continued)		
Nushagak Section Only		
DLG 03	June 26 12:01 a.m. to June 26 12:00 N	12 hrs.
Igushik Section Only		
DLG 02	June 23 10:00 a.m. to June 23 10:00 p.m.	12 hrs.
DLG 03	June 25 12:00 N to June 26 12:00 N	24 hrs.
TOGIAK DISTRICT		
DLG 09	July 15 9:00 a.m. to July 18 9:00 a.m.	3 days
DLG 10	July 22 9:00 a.m. to July 25 9:00 a.m.	3 days
DLG 11	Sept. 5 9:00 a.m. to Sept. 30 12:00 MN	25 days, 15 hrs.[2]

II. Commissioner's Announcements[1] Number	Effective Date	Description
DLG 01-83	July 4 6:00 p.m.	Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Nushagak district as required under 5 AAC 06.370.
AKN 01-83	June 30 9:00 p.m.	Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Naknek-Kvichak district as required under 5 AAC 06.370.
AKN 02-83	July 1 6:00 p.m.	Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Egegik district as required under 5 AAC 06.370.
AKN 03-83	July 13 12:00 N	Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Ugashik district as required under 5 AAC 06.370.

(continued)

Table 9. (continued)

III. General Announcements[1/] Number	Date		Description
DLG 1	June 14	12:00 N	This is the ADF&G with an announcement concerning a commercial fishing closure in the Nushagak district. The present Nushagak fishing period will close at 9 a.m. on Wednesday, June 15. We anticipate a closure of undetermined length to improve the rate of king salmon escapement into the Nushagak River. Presently we estimate a king escapement of less than 10,000 fish, while the commercial catch is projected to total about 50 to 55,000 through Wednesday morning's closure. Continuous monitoring of the king daily escapement rates will be conducted through analysis of subsistence catches in the Dillingham area and at the Lewis Pt. fish camps, as well as a final check at our sonar counting station just below Portage Creek. Sonar counts to date show daily rates of 400 to 700 fish passing the site per day, with the majority of these fish being kings.
DLG 2	June 18	12:00 N	This is the ADF&G with a general announcement concerning the Nushagak district boundary markers. The Nushagak district Fish and Game buoys were placed Friday, June 17 to help define the Nushagak district fishing boundaries. Three lighted buoys were placed to locate the closed Snake River section, and the lower limit sockeye salmon line of the Nushagak/ Igushik River sections. All buoys have fluorescent orange radar reflectors and a flashing light with a 2 second flash and a 3 second eclipse. Please remember that these buoys are aids to help fishermen locate the boundary lines. If the buoys drag or are pulled out of position, the legal boundary does not shift position. Fishermen are also reminded it is prohibited by regulation to tie up to Department buoys. Land markers, range lights and range panels have been deployed at Etolin Point and Nichols Hills to help define the outer Nushagak sockeye salmon boundary line. Maps and marker descriptions are available at the Dillingham Fish and Game office.
DLG 3	June 19	12:00 N	King salmon escapement into the Nushagak River remains slow. Constant monitoring of the subsistence nets on local beaches and at Lewis Point indicates only a small increase in escapement. Counts from our sonar station at Portage Creek reveal an estimated daily passage rate of approximately 400 fish, consisting of a mixture of kings, sockeye and chums.

(continued)

Table 9. (continued)

III. General Announcements[1/] Number	Date		Description
DLG 3	June 19	12:00 N	(continued)
			The Nushagak commercial fishery is presently on hold with no anticipated announcements regarding an opening at this time. We are presently monitoring the Igushik sockeye salmon run with a test fish operation in Igushik River. Should catches become substantial there, we may go with the option of an Igushik section only opening, if the king salmon escapement remains low. However, we repeat, no announcements are anticipated at the present time. The Naknek/Kvichak, Egegik and Ugashik districts will open at 9 a.m. on Monday, June 20, and will remain open until 9 a.m. Thursday, June 23, when they will go into their emergency order period.
DLG 4	June 21	12:00 N	This is the ADF&G with a general announcement concerning the king salmon escapement into the Nushagak River. The king salmon escapement into the Nushagak River has increased substantially as shown by king catches in subsistence nets on Kanakanak and Skinners Beaches in Dillingham, where catch per unit of effort (CPUE) averaged 17 kings on the June 20 mid-day high water and 10 kings on last nights' tide. King catches at Lewis Point have also increased to 17 kings per net on yesterday's high water and further to 46 kings per net on the midnight tide. Portage Creek sonar shows a marginal pickup, increasing to a 1,200 daily count on June 20, up from the previous 9 day average of 400 fish per day. Test fish apportionment of these fish show approximately 60% kings, 40% sockeye and chums. Total king escapement through June 20 is 4,000 past the sonar site, and an estimated escapement of 5 to 6,000 kings prior to the installation of sonar gear for a total king escapement of about 10,000. The sonar count should continue to increase, if the kings continue to move upriver. We do not anticipate an announcement today for fishing time tomorrow, but if king subsistence catch indices continue to be strong, and the sonar count trend improves, fishing time is imminent.
DLG 5	June 22	12:00 N	This is the ADF&G with an announcement concerning the status of the Nushagak fishery. The king salmon escapement into the Nushagak River appears to be increasing as determined from subsistence catches on the local beaches and at Lewis Point, and counts from our sonar station at Portage Creek. However, counts have not increased enough to warrant an

(continued)

Table 9. (continued)

III. General Announcements[1/]			
Number	Date		Description
DLG 5	June 22	12:00 N	(continued)
			immediate opening for the entire Nushagak district. A potential Igushik section only opening is being considered for tomorrow. Our test fish program on the lower Igushik River indicates a good movement of sockeye salmon into that system, which is normally slightly earlier than the other Nushagak tributaries. Evaluation of today's test fish indices and an aerial survey that is now in progress will determine whether a fishery in the Igushik section will be possible for tomorrow. Please stand by for a status report and potential fishery announcement at 6 p.m. tonight on VHF 7 and on KDLG.
DLG 6	June 30	12:00 N	This is the ADF&G in Dillingham with an announcement regarding the status of the Nushagak fishery. We were anticipating that the run would develop enough strength today to allow an opening tomorrow. However, test boat catches last night and this morning have not been impressive. Only moderate fish passage is indicated in the upper district. Escapements past the Wood River and the Nushagak sonar sites are also slow. We will be sending the test boat back out on this evening's tide. We would encourage the fleet to stand by for additional aerial survey and test boat results. At this time, unless the Nushagak run status changes dramatically, we do not anticipate an opening before Friday night or Saturday morning.
DLG 7	July 1	12:00 N	This is the ADF&G in Dillingham with a general announcement concerning the status of the Nushagak fishery. Our latest test boat indices from last night and this morning's tides are still not showing any strong movement of fish into the upper district. However, it is evident that there are strong numbers of fish in the outer sections. There is some indication that the 3-ocean year class in Nushagak district is less than forecast. Therefore, it is necessary that we observe a strong escapement into the main Nushagak River before fishing time is allowed. Aerial surveys yesterday evening also did not show any significant change in the lower portions of the Nushagak or Wood Rivers. Escapements past the Wood River tower and the Nushagak sonar counters are still weak. The Wood River count now stands at 197,000 while Nushagak sonar is reporting 41,000. We will be sending the test boat back out on this evening's tide to determine if fish are moving into the river on the ebb tide. Because the situation can rapidly change at this late date, we strongly encourage fishermen to be prepared for a possible short notice opening.

Table 9. (continued)

III. General Announcements[1] Number	Date		Description
DLG 8	July 2	12:00 N	This is the ADF&G with a general announcement concerning the status of the Nushagak fishery. Continued test boat coverage in the district shows a gradual buildup of fish within the district, but no sign of strong fish movement above the fishery as of this morning. Aerial surveys flown early today confirm that Wood River has no strength, especially in the lower river. Subsistence nets at Kanakanak, Skinners, Snag Point and in Wood River show no strength on this morning's tide, all indicating no strength above the fishery. Test boat coverage from last night to this morning has shown that the fish have reached Clarks Point in strength. Test catches in the Combine are lower, but indicative that some fish are beginning to move. Our concern at this time is the possibility of a weaker than forecast run of 5 year old fish. The Nushagak forecast is composed of about 45% 5 yr. old fish. The Nuyakuk River system forecast are mostly 5 year fish (80%), and sonar escapement at Portage Creek has reached only 55,000 by this morning, 17% of escapement requirements. The Wood River escapement is 205,000, 20% of the goal. Our intentions are to send the test boat back out this evening and work the upper Nushagak River area and the Combine. Once inriver escapement is confirmed, fishing time will follow. We may announce with very little advance notice. We have now accounted for only 22% of the Nushagak forecast of 5.8 million. However, if the 5 year run strength is reduced, we may be looking at a Nushagak run in the range of 3.5 to 4.5 million fish. If run strength is reduced it's even more important to see a solid indication of escapement before fishing time is allowed. If indicators of run strength inshore improve, announcement for fishing time is imminent.

1/ Prefix code on emergency orders and Commissioner's announcements and general announcements indicate office where announcement originated ("AKN" for King Salmon and "DLG" for Dillingham).

2/ Closed to fishing.

Table 10. Commercial salmon catch by period and species, Naknek-Kvichak district, Bristol Bay, 1983.

Period	Time	Effort[1] Drift	Effort[1] Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
5/30-6/4	5 days				1				1
6-11	5 days			98	38				136
13-18	5 days			14,400	703	751			15,854
20	15 hrs.	408	344	57,603	496	1,400			59,499
21	24 hrs.			114,581	593	5,957			121,131
22	24 hrs.			84,403	203	914			85,520
23	9 hrs.			169,834	149	2,477			172,460
27-28	12 hrs.			1,786,585	222	17,243			1,804,050
29	10 hrs.			990,485	251	5,011			995,747
30	24 hrs.	800	344	2,026,503	618	10,628			2,037,749
7/ 1[2]	24 hrs.			1,048,113	379	6,465			1,054,957
2	24 hrs.			1,597,511	641	12,614			1,610,766
3	24 hrs.	1,000	344	1,770,565	405	12,414			1,783,384
4	24 hrs.			1,261,565	391	9,841			1,271,797
5	24 hrs.			1,512,347	392	8,290			1,521,029
6[3]	17 hrs.			1,474,296	438	13,042			1,487,776
7	17 hrs.	900	344	821,645	231	6,336			828,212
8	24 hrs.			880,942	297	9,177			890,416
9[4]	24 hrs.			833,249	351	10,653			844,253
10	24 hrs.	800	344	1,016,735	278	17,351			1,034,364
11	24 hrs.			960,884	339	16,543			977,766
12	24 hrs.	750	344	665,182	373	12,415			677,970
13	24 hrs.			920,073	344	22,996			943,413
14	24 hrs.			472,720	247	15,649			488,616
15	24 hrs.			61,669	120	4,797			66,586
16-17	33 hrs.			203,418	154	14,710			218,282
18	15 hrs.			258,563	138	16,719			275,420
19	24 hrs.			139,902	174	13,118			153,194
20	24 hrs.			54,733	131	10,024	3		64,891
21	24 hrs.			47,979	297	15,319	8	48	63,651
22-23	33 hrs.	59	201	29,666	338	13,843	3	5	43,855
25-30	5 days			38,066	204	19,187	1	25	57,483
8/ 1- 6	5 days			12	6			4	22
Total				21,314,327	9,942	325,884	15	82	21,650,250
Percent of District Catch				98.4	+	1.5	+	+	100.0

1/ Estimated fishing effort based on aerial surveys.
2/ Entire district open from 2:00 p.m., July 1 until further notice.
3/ Entire district closed from 5:00 p.m., July 6 until 7:00 a.m., July 7.
4/ Naknek section closed from 7:00 p.m., July 9 until 11:00 p.m., July 11.

Table 11. Commercial salmon catch by period and species, Egegik district, Bristol Bay, 1983.

Period	Time	Effort 1/ Drift	Effort 1/ Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
6/ 7	24 hrs.		26	2	7				9
8	24 hrs.			24	38	8			70
9	24 hrs.			5	79	4			88
10	24 hrs.			43	126	20			189
11	9 hrs.			26	177	23			226
13	15 hrs.			657	66	50			773
14	24 hrs.			2,695	134	83			2,912
15	24 hrs.	41	82	3,261	275	326			3,862
16	24 hrs.			7,287	255	674			8,216
17	24 hrs.			15,684	421	1,605			17,710
18	9 hrs.			8,966	200	1,652			10,818
20	15 hrs.	225	106	45,063	426	1,809			47,298
21	24 hrs.			40,226	316	1,681			42,223
22	24 hrs.	177	153	33,347	397	886			34,630
23	9 hrs.			52,144	414	1,836			54,394
26-27	14 hrs.	185	177	487,105	210	4,475			491,790
28	12 hrs.			336,625	135	3,723			340,483
29	24 hrs.			432,429	182	4,635			437,246
30	24 hrs.	171	199	400,510	149	4,501			405,160
7/ 1	24 hrs.			449,265	121	6,236			455,622
2	24 hrs.			379,405	84	4,802			384,291
3	24 hrs.			393,856	81	3,935			397,872
4	24 hrs.	191	187	412,251	65	3,712			416,028
5	24 hrs.			441,761	71	5,551			447,383
6	24 hrs.			437,788	42	7,396			445,226
7	24 hrs.			473,865	67	7,368			481,300
8	24 hrs.			330,746	56	4,324			335,126
9	24 hrs.			194,097	62	3,982			198,141
10	24 hrs.			299,069	48	5,796			304,913
11	24 hrs.			231,520	31	4,273			235,824
12	24 hrs.	140	195	197,119	22	4,254			201,395
13	24 hrs.			156,665	14	3,987			160,666
14	24 hrs.			182,022	21	5,954			187,997
15	24 hrs.			82,963	19	4,340			87,322
16	24 hrs.			62,985	10	4,995			67,990
17	9 hrs.			16,391	1	652			17,044
18	24 hrs.			37,240	4	2,794			40,038
19	24 hrs.	37	104	43,747	9	3,319			47,075
20	24 hrs.			22,045	2	2,572			24,619

(continued)

Table 11. (continued)

Period	Time	Effort 1/ Drift	Effort 1/ Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
7/21	24 hrs.			12,392	4	1,229			13,625
22	24 hrs.			9,451	1	407			9,859
23	9 hrs.			1,507		167			1,674
25	15 hrs.			3,123	1	368		57	3,549
26	24 hrs.			568		528		106	1,202
27	24 hrs.			984		423		578	1,985
28	24 hrs.			618		492		633	1,743
29	24 hrs.			437		338		225	1,000
30	9 hrs.			182		90		106	378
8/ 1	15 hrs.			21		167		230	418
2	24 hrs.			4		146		151	301
3	24 hrs.			90		141		242	473
4	24 hrs.			10		206		332	548
5	24 hrs.			15		106		157	278
8	15 hrs.			3		107		218	328
9	24 hrs.			1		213		882	1,096
10	24 hrs.			2		222		849	1,073
11	24 hrs.			2		79		765	846
12	24 hrs.			1		55		745	801
13	9 hrs.					14		375	389
15	15 hrs.					3		1,172	1,175
16	24 hrs.					27		1,699	1,726
17	24 hrs.					62		1,820	1,882
18	24 hrs.					17		1,062	1,079
19	24 hrs.					4		1,072	1,076
20	9 hrs.					7		474	481
22	15 hrs.							867	867
23	24 hrs.					3		1,883	1,886
24	24 hrs.					6		2,127	2,133
25	24 hrs.							1,178	1,178
26	24 hrs.							1,555	1,555
27	9 hrs.							25	25
Total				6,740,310	4,843	123,860	0	21,585	6,890,598
Percent of District Catch				97.8	0.1	1.8		0.3	100.0

1/ Estimated fishing effort based on aerial surveys.

Table 12. Commercial salmon catch by period and species, Ugashik district, Bristol Bay, 1983.

Period	Time	Effort 1/ Drift	Effort 1/ Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
5/30	15 hrs.				13				13
31	24 hrs.				163				163
6/ 1	24 hrs.				112				112
2	24 hrs.				188				188
3	24 hrs.				80				80
4	9 hrs.				12				12
6	15 hrs.				106				106
7	24 hrs.	27	7		309				309
8	24 hrs.				281				281
9	24 hrs.				364				364
10	24 hrs.				363				363
11	9 hrs.				218				218
13	15 hrs.			5	201				206
14	24 hrs.			83	727				810
15	24 hrs.	31	10	107	821				928
16	24 hrs.			336	955				1,291
17	24 hrs.			361	436	23			820
18	9 hrs.			621	233	45			899
20	15 hrs.	34	16	3,711	578	237			4,526
21	24 hrs.			10,242	588	504			11,334
22	24 hrs.			12,935	330	549			13,814
23	9 hr.s			5,158	89	271			5,518
26-27	14 hrs.	63	32	68,641	65	1,659			70,365
29	11 hrs.			71,013	41	1,558			72,612
30	24 hrs.	89	40	162,942	336	2,280			165,558
7/ 1	14 hrs.	105	47	138,452	199	2,260			140,911
3	9 hrs.			122,914	28	3,675			126,617
4	24 hrs.	84	56	240,282	114	4,481			244,877
5	17 hrs.			151,414	85	3,611			155,110
7	6 hrs.			27,269	29	989			28,287
8	19 hrs.	137	50	426,595	45	10,696			437,336
9	4 hrs.			72,551	3	1,722			74,276
10	24 hrs.	189	70	436,034	84	11,141			447,259
11	24 hrs.			388,755	47	13,149			401,951
12	24 hrs.	202	53	406,310	38	12,790			419,138
13	24 hrs.			172,374	66	9,820			182,260
14	24 hrs.			75,990	34	4,612			80,636
15	24 hrs.			53,350	34	2,394			55,778
16	24 hrs.			51,312	35	2,299			53,646
17	24 hrs.			85,813	57	5,858			91,728
18	24 hrs.			39,618	18	3,300			42,936
19	24 hrs.	66	39	39,266	18	2,593			41,877

(continued)

Table 12. (continued)

Period	Time	Effort 1/ Drift	Effort 1/ Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
7/20	24 hrs			25,178	28	1,785			26,991
21	24 hrs.			17,698	9	1,747			19,454
22	24 hrs.			10,104	23	1,082			11,209
23	9 hrs.			1,843	4	237			2,084
25	15 hrs.			2,776		100			2,876
26	24 hrs.			5,174	1	162			5,337
27	24 hrs.			4,806		153			4,959
28	24 hrs.			4,442		254			4,696
29	24 hrs.			4,127		206			4,333
30	9 hrs.			68					68
8/ 1	15 hrs.			220		2		1	223
2	24 hrs.			642		70		8	720
3	24 hrs.			276		49		8	333
4	24 hrs.			85		11		14	110
5	24 hrs.			5				11	16
6	9 hrs.			9				6	15
9	24 hrs.			14				18	32
10	24 hrs.			17				33	50
11	24 hrs.			6				58	64
12	24 hrs.			7				43	50
13	9 hrs.			14				117	131
17	24 hrs.			4				79	83
18	24 hrs.			2				709	711
19	24 hrs.			2				729	731
20	9 hrs.			4				537	541
22	15 hrs.			1				850	851
23	24 hrs.							575	575
24	24 hrs.							809	809
25	24 hrs.							352	352
26	24 hrs.							428	428
27	9 hrs.							269	269
29	15 hrs.							321	321
30	24 hrs.							526	526
31	24 hrs.							432	432
9/ 1	24 hrs.							392	392
2	24 hrs.							385	385
3	9 hrs.							87	87
Total				3,341,978	8,608	108,374	0	7,797	3,466,757
Percent of District Catch				96.4	0.3	3.1		0.2	100.0

1/ Estimated fishing effort based on aerial surveys.

Table 13. Commercial salmon catch by period and species, Nushagak district, Bristol Bay, 1983.

Period	Time	Effort[1] Drift	Effort[1] Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
5/23-28	5 days				783				783
30	15 hrs.	100			1,928				1,928
31	24 hrs.	97			1,112				1,112
6/ 1	24 hrs.	186			1,641				1,641
2	24 hrs.	117			951				951
3	24 hrs.	123			833				833
4	9 hrs.				1,104				1,104
6	15 hrs.	279			2,295				2,295
7	24 hrs.	468		1	8,735				8,736
8	24 hrs.	347			5,374	1			5,375
9	24 hrs.	475		1	6,139				6,140
10	24 hrs.	419		7	5,065	8			5,080
11	9 hrs.	99			1,868	3			1,871
13	15 hrs.	441		195	6,494	18			6,707
14	24 hrs.	655	48	829	16,185	62			17,076
15[2]	9 hrs.	318		93	7,057	41			7,191
23[2]	12 hrs.	369	66	44,413	2,011	4,172			50,596
25[2]	12 hrs.	300	63	23,189	348	2,364			25,901
26	12 hrs.	509		414,331	28,660	69,259			512,250
28	12 hrs.	584	230	478,615	6,297	69,172			554,084
7/ 3	18 hrs.	485	233	809,864	6,301	58,229	2		874,396
4	24 hrs.	396		471,587	4,539	31,255	1		507,382
5	24 hrs.	367		577,421	3,117	43,996	3		624,537
6	24 hrs.	345		351,771	3,072	31,734	2		386,579
7	24 hrs.	352		369,235	3,406	33,138	3		405,782
8	24 hrs.	280		307,538	2,093	28,057	6		337,694
9	24 hrs.	240		140,680	953	16,111	8		157,752
10	24 hrs.	194		158,882	1,010	18,612	10		178,514
11	24 hrs.	224		219,011	1,161	27,953	13		248,138
12	24 hrs.	320		224,216	978	29,706	5	3	254,908
13	24 hrs.	249		305,477	3,565	40,862		4	349,908
14	24 hrs.	193		120,459	1,147	14,576	3	7	136,192
15	24 hrs.	140		55,501	446	8,278	6	3	64,234
16	24 hrs.	45		48,620	172	4,690	3	74	53,559
17	24 hrs.	80		51,925	324	9,643	7	74	61,973
18	24 hrs.	112		36,567	333	9,497	8	22	46,427
19	24 hrs.	97		24,698	289	6,116	7	9	31,119
20	24 hrs.	81		17,365	234	6,071	11	49	23,730
21	24 hrs.	75		16,862	266	6,394	9	512	24,043
22	24 hrs.	63		12,177	282	4,059	7	661	17,186
23	9 hrs.			2,595	36	1,168		53	3,852
25	15 hrs.	67		3,737	68	1,490		902	6,197
26	24 hrs.	40		2,925	61	1,124	2	1,039	5,151
27	24 hrs.	43		1,652	24	664		321	2,661
28	24 hrs.	25		926	27	350	1	91	1,395

(continued)

Table 13. (continued)

Period	Time	Effort 1/ Drift	Effort 1/ Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
7/29	24 hrs.	32		865	17	120		35	1,037
30	9 hrs.			83	8	77		6	174
8/ 1	15 hrs.	49		510	110	1,935		4,289	6,844
2	24 hrs.	95		655	126	3,155		6,341	10,277
3	24 hrs.	66		238	88	1,019		3,840	5,185
4	24 hrs.	81		164	115	502		4,668	5,449
5	24 hrs.	66		143	28	265		12,435	12,871
6	9 hrs.	29		60	11	59		3,969	4,099
8	15 hrs.	43		7	2	18		2,341	2,368
9	24 hrs.	52		51	17	28		1,233	1,329
10	24 hrs.	41		55	6	42		1,279	1,382
11	24 hrs.	32		15	4	23	3	1,516	1,561
12	24 hrs.	24		34	12	18		955	1,019
13	9 hrs.	8		11	4	13		603	631
15	15 hrs.	3				5		147	152
16	24 hrs.	10		14	9	9		1,874	1,906
17	24 hrs.	16		4	16	4		4,517	4,541
18	24 hrs.	23		15	11			750	776
19	24 hrs.	14			2			3,829	3,831
22	15 hrs.	12		12	2			3,567	3,581
23	24 hrs.	24		10	20	1		2,238	2,269
24	24 hrs.	12		4	2			1,165	1,171
25	24 hrs.	11		5	3			421	429
26	24 hrs.	13		2	1			2,290	2,293
27	9 hrs.	2						698	698
29	15 hrs.	12						5,947	5,947
30	24 hrs.	20						3,792	3,792
31	24 hrs.	6			1			1,292	1,293
9/ 1	24 hrs.	7						193	193
2	24 hrs.	3			1			102	103
5	15 hrs.	5						404	404
6	24 hrs.	5						99	99
7	24 hrs.	3						158	158
8	24 hrs.	2						41	41
Total				5,296,322	139,400	586,166	120	80,858	6,102,866
Percent of District Catch				86.8	2.3	9.6	+	1.3	100.0

1/ Estimated fishing effort based on aerial surveys and on reliable CPUE data from selected processors; beginning July 4 drift effort totals include some set nets.

2/ Igushik section only.

Table 14. Commercial sockeye salmon catch by period from Clarks Point, Ekuk and Igushik beaches, Nushagak district, Bristol Bay, 1983.

Period	Time	Number of Fish		
		Clarks Point Beach 3/	Ekuk Beach 4/	Igushik Beach 5/
6/15			89	
23 1/	12 hrs.			22,878
25-26 2/	24 hrs.	7,763	12,628	8,406
28	12 hrs.	7,139	17,979	6,110
7/ 3	18 hrs.	9,837	32,306	19,100
4	24 hrs.	5,333	21,059	28,193
5	24 hrs.	4,420	27,749	13,564
6	24 hrs.	4,030	12,075	15,579
7	24 hrs.	8,736	16,964	9,627
8	24 hrs.	2,333	10,823	10,492
9	24 hrs.	146	2,865	5,776
10	24 hrs.	454	3,214	2,142
11	24 hrs.	250	2,400	2,541
12	24 hrs.	2,123	25,101	7,158
13	24 hrs.	4,254	28,515	7,250
14	24 hrs.	2,045	19,377	7,862
15	24 hrs.	836	11,458	503
16	24 hrs.	3,866	24,418	716
17	24 hrs.	1,124	7,153	834
18	24 hrs.	815	9,080	1,038
19	24 hrs.	275	7,626	804
20	24 hrs.	358	4,722	685
21	24 hrs.	422	4,620	
22	24 hrs.	326	4,025	
23	9 hrs.	229	1,786	
25-30	5 days	46	1,888	
Total		67,160	309,920	171,258

1/ Igushik section only.
2/ First 12 hours Igushik section only, second 12 hours entire district.
3/ Approximate fishing effor was 20 set nets. Sockeye salmon accounted for 97.4% of the total beach catch; catch of other species included 745 kings, 793 chums, and 262 cohos.
4/ Approximate fishing effort was 75 set nets. Sockeye salmon accounted for 97.0% of the total beach catch; catch of other species included 1,400 kings, 7,725 chums, 73 pinks and 316 cohos.
5/ Approximate fishing effort was 12 skiffs and 67 set nets. Sockeye salmon accounted for 97.1% of the total beach catch; catch of other species included 718 kings, 4,270 chums, 44 pinks and 5 cohos.

Table 15. Commercial salmon catch by period and species, Togiak district, Bristol Bay, 1983.

Period	Time[1]	Effort[2] Drift	Effort[2] Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
6/ 6					9				9
7					48				48
8				2	26				28
9				5	24				29
10				2	12	1			15
11				1	12				13
13				8	41	1			50
14				48	781	59			888
15				162	878	93			1,133
16				129	1,075	130			1,334
17				109	378	52			539
18					27				27
20				392	1,856	165			2,413
21				2,016	4,096	977			7,089
22				1,968	2,191	1,247			5,406
23				2,841	1,939	1,325	1		6,106
24				2,239	1,220	985			4,444
25				309	89	80			478
27				2,377	1,025	767			4,169
28				9,098	2,932	6,235	1	1	18,267
29				9,771	2,037	7,246			19,054
30				11,784	2,156	7,835	6		21,781
7/ 1				11,499	1,857	6,932	2		20,290
2				2,351	162	1,747	3		4,263
4				14,150	2,882	5,894	13		22,939
5				26,395	2,642	13,010	26		42,073
6				26,570	1,151	12,732	18		40,471
7				19,229	1,127	10,228	12		30,596
8				12,674	445	3,072	15		16,206
9				1,173	26	1,911	3		3,113
11[3]				19,051	457	20,502	4		40,014
12				29,575	589	26,613	18		56,795
13				31,848	462	26,865	12		59,187
14				36,905	359	23,070	8		60,342
15				33,873	284	10,932	5		45,094
16				16,071	184	4,188	9		20,452
17				18,519	102	7,775	1		26,397
18				39,591	350	19,970	7		59,918
19				36,558	326	18,785	18	47	55,734
20				33,906	358	17,915	21		52,200
21				26,334	322	13,505	5		40,166
22				23,611	278	10,879	11	1	34,780

(continued)

Table 15. (continued)

Period	Time[1]	Effort[2] Drift	Effort[2] Set	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
7/23				13,492	145	5,852	5		19,494
24				6,052	69	2,110			8,231
25				11,047	67	6,021	2		17,137
26				9,442	101	5,465	2		15,010
27				10,467	123	4,247	3		14,840
28				11,989	124	5,203	9	1	17,326
29				4,972	102	1,346	13	1	6,434
8/ 1				1,684	35	1,685		1	3,405
2				2,153	61	1,676			3,890
3				3,210	60	1,793		8	5,071
4				2,237	37	1,286		8	3,568
5				1,279	19	552		1	1,851
9				436	15	191		27	669
10				450	22	362		39	873
11				258	16	199		38	511
12				488	27	185		58	758
15				163	19	120		182	484
16				307	18	158		195	678
17				213	17	122		170	522
18				147	8	90		300	545
19				96	8	55		238	397
22				36	2	15		113	166
23				81	5	27		234	347
24				125	12	34		711	882
25				119	13	69		1,099	1,300
26				5		6	2	188	201
29					3	12		440	455
30					8	23		396	427
31					3	15		192	210
9/ 1					5	25		522	552
2					1	3		470	474
Total		150	40	584,092	38,360	322,670	255	5,681	951,058
Percent of District Catch				61.4	4.0	34.0	+	0.6	100.0

Summary Catch by Section

Section	Number of Fish Sockeye	King	Chum	Pink	Coho	Total
Togiak	531,953	34,699	302,146	241	4,469	873,508
Kulukak	50,300	3,563	19,057	13	700	73,633
Osviak	652	72	881		453	2,058
Matogak	1,187	26	586	1	59	1,859
Total	584,092	38,360	322,670	255	5,681	951,058

1/ Togiak River section open 4 days-per-week, while other sections open 5 days-per-week.
2/ Estimated fishing effort based on processor information for peak of sockeye season.
3/ Continuous fishing was allowed from July 11 through 9:00 a.m., July 29.

Table 16. Total commercial salmon catch by day and district, Bristol Bay, 1983[1/]

Date	Time	Number of Fish in Thousands					
		Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
>6/11		+	1	2	38	+	41
12-18	5 days	16	44	5	33	4	102
20	24 hrs.	59	47	5		2	113
21	24 hrs.	121	42	11		7	181
22	24 hrs.	86	35	14		5	140
23	24 hrs.	172	54	6	51	6	289
24	24 hrs.					4	4
25	24 hrs.				26	+	26
26	24 hrs.				512		512
27	24 hrs.		492	70		4	566
28	24 hrs.	1,804	340		554	18	2,716
29	24 hrs.	996	437	73		19	1,525
30	24 hrs.	2,038	405	166		22	2,631
7/ 1	24 hrs.	1,055	456	141		20	1,672
2	24 hrs.	1,611	384			4	1,999
3	24 hrs.	1,783	398	127	874		3,182
4	24 hrs.	1,272	416	245	507	23	2,463
5	24 hrs.	1,521	447	155	625	42	2,790
6	24 hrs.	1,488	445		387	40	2,360
7	24 hrs.	828	481	28	406	31	1,774
8	24 hrs.	890	335	437	338	16	2,016
9	24 hrs.	844	198	74	158	3	1,277
10	24 hrs.	1,034	305	447	179		1,965
11	24 hrs.	978	236	402	248	40	1,904
12	24 hrs.	678	201	419	255	57	1,610
13	24 hrs.	943	161	182	350	59	1,695
14	24 hrs.	489	188	81	136	60	954
15	24 hrs.	67	87	56	64	45	319
16	24 hrs.	218	68	54	54	20	414
17	24 hrs.		17	92	62	26	197
18	24 hrs.	275	40	43	46	60	464
19	24 hrs.	153	47	42	31	56	329
20	24 hrs.	65	25	27	24	52	193
21	24 hrs.	64	14	19	24	40	161
22	24 hrs.	44	10	11	17	35	117
23	24 hrs.		2	2	4	19	27
24	24 hrs.					8	8
25-30	5 days	57	10	22	17	71	177
8/ 1- 6	5 days	+	2	1	45	18	66
8-13	5 days		5	+	8	3	16
15-20	5 days		7	2	11	3	23
22-27	5 days		8	3	10	3	24
29>				2	12	2	16
Total		21,650	6,891	3,467	6,103	951	39,062

1/ Due to rounding the daily catches may not equal the sum of the district totals.

Table 17. Commercial salmon catch by district and species, Bristol Bay, 1983.[1/]

District and River System	Number of Fish					
	Sockeye	King	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT						
Kvichak River	16,352,189					
Branch River	455,757					
Naknek River	4,506,381					
Total	21,314,327	9,942	325,884	15	82	21,650,250
EGEGIK DISTRICT	6,740,310	4,843	123,860		21,585	6,890,598
UGASHIK DISTRICT	3,341,978	8,608	108,374		7,797	3,466,757
NUSHAGAK DISTRICT						
Wood River	3,185,969					
Igushik River	497,311					
Nuyakuk River	1,253,165					
Nushagak-Mulchatna	350,613					
Snake River	9,264					
Total	5,296,322	139,400	586,166	120	80,858	6,102,866
TOGIAK DISTRICT						
Togiak Section	531,953					
Kulukak Section	50,300					
Osviak Section	652					
Matogak Section	1,187					
Total	584,092	38,360	322,670	255	5,681	951,058
TOTAL BRISTOL BAY	37,277,029	201,153	1,466,954	390	116,003	39,061,529
SPECIES PERCENT	95.3	0.5	3.8	+	0.3	100.0

1/ Apportionment of the inshore sockeye salmon catch by river system to the Naknek-Kvichak and Nushagak districts is preliminary.

Table 18. Daily sockeye salmon escapement tower counts by river system, Bristol Bay, 1983.

Date	Kvichak River Daily	Kvichak River Accum.	Naknek River Daily	Naknek River Accum.	Egegik River Daily	Egegik River Accum.	Ugashik River Daily	Ugashik River Accum.
6/18			0	0				
19	0	0	0	0				
20	66	66	132	132			0	0
21	150	216	48	180	240	240	0	0
22	174	390	36	216	4,950	5,190	0	0
23	54	444	384	600	786	5,976	6	6
24	48	492	228	828	2,352	8,328	54	60
25	6	498	168	996	7,656	15,984	90	150
26	6	504	24,042	25,038	12,192	28,176	84	234
27	2,628	3,132	70,614	95,652	25,512	53,688	66	300
28	139,062	142,194	76,950	172,602	63,360	117,048	12	312
29	378,324	520,518	86,148	258,750	156,672	273,720	102	414
30	422,922	943,440	55,164	313,914	168,462	442,182	276	690
7/ 1	422,352	1,365,792	40,680	354,594	77,466	519,648	18	708
2	316,806	1,682,598	23,568	378,162	54,150	573,798	942	1,650
3	96,084	1,778,682	33,582	411,744	14,250	588,048	2,178	3,828
4	86,694	1,865,376	27,390	439,134	12,888	600,936	138	3,966
5	99,576	1,964,952	27,612	466,746	30,396	631,332	30	3,996
6	46,890	2,011,842	32,784	499,530	25,818	657,150	49,374	53,370
7	42,204	2,054,046	66,420	565,950	26,184	683,334	9,252	62,622
8	155,844	2,209,890	29,202	595,152	15,162	698,496	21,630	84,252
9	349,170	2,559,060	33,048	628,200	10,332	708,828	12,342	96,594
10	95,220	2,654,280	22,362	650,562	5,220	714,048	31,104	127,698
11	31,884	2,686,164	83,070	733,632	4,320	718,368	200,904	328,602
12	48,990	2,735,154	41,982	775,614	4,986	723,354	72,840	401,442
13	54,708	2,789,862	27,282	802,896	3,234	726,588	71,016	472,458
14	63,336	2,853,198	30,114	833,010	6,042	732,630	173,064	645,522
15	341,754	3,194,952	6,972	839,982	6,582	739,212	132,630	778,152
16	222,414	3,417,366	2,238	842,220	2,106	741,318	38,958	817,110
17	29,346	3,446,712	6,984	849,204	2,712	744,030	14,634	831,744
18	39,834	3,486,546	20,796	870,000	6,918	750,948	10,236	841,980
19	52,686	3,539,232	11,790	881,790	13,434	764,382	12,318	854,298
20	19,266	3,558,498	4,230	886,020	9,312	773,694	14,862	869,160
21	6,138	3,564,636	2,274	888,294	9,300	782,994	19,416	888,576
22	4,170	3,568,806			4,446	787,440	12,846	901,422
23	1,176	3,569,982			2,466	789,906	11,448	912,870
24					2,376	792,282	6,150	919,020
25							3,168	922,188
26							4,884	927,072
27							14,550	941,622
28							13,836	955,458
29							14,250	969,708
30							12,732	982,440
31							9,684	992,124
8/ 1							4,824	996,948
2							3,462	1,000,410
3							204	1,000,614
System Total		3,569,982		888,294		792,282		1,000,614

(continued)

Table 18. (continued)

Date	Wood River Daily	Wood River Accum.	Igushik River Daily	Igushik River Accum.	Nuyakuk River Daily	Nuyakuk River Accum.	Togiak River Daily	Togiak River Accum.
6/16	0	0						
17	0	0						
18	0	0						
19	0	0						
20	618	618						
21	1,602	2,220	0	0				
22	870	3,090	0	0				
23	1,302	4,392	18	18				
24	2,256	6,648	834	852				
25	756	7,404	3,312	4,164				
26	16,272	23,676	6,024	10,188			36	36
27	65,952	89,628	5,682	15,870			0	36
28	42,618	132,246	7,926	23,796			0	36
29	36,174	168,420	5,160	28,956			0	36
30	13,788	182,208	8,226	37,182	0	0	606	642
7/ 1	23,190	205,398	6,642	43,824	0	0	2,394	3,036
2	10,026	215,424	6,120	49,944	22,920	22,920	4,386	7,422
3	299,970	515,394	6,792	56,736	27,078	49,998	2,964	10,386
4	599,454	1,114,848	8,040	64,776	17,046	67,044	1,452	11,838
5	94,944	1,209,792	10,632	75,408	12,054	79,098	2,574	14,412
6	14,838	1,224,630	11,916	87,324	7,026	86,124	5,136	19,548
7	13,266	1,237,896	11,616	98,940	22,212	108,336	6,054	25,602
8	13,614	1,251,510	12,510	111,450	66,474	174,810	6,486	32,088
9	20,250	1,271,760	9,288	120,738	54,462	229,272	5,076	37,164
10	5,508	1,277,268	10,824	131,562	41,346	270,618	5,178	42,342
11	3,222	1,280,490	6,252	137,814	21,462	292,080	5,364	47,706
12	1,956	1,282,446	3,738	141,552	13,056	305,136	8,928	56,634
13	2,352	1,284,798	2,514	144,066	4,698	309,834	14,856	71,490
14	34,278	1,319,076	1,452	145,518	3,972	313,806	17,274	88,764
15	14,730	1,333,806	4,944	150,462	2,154	315,960	10,662	99,426
16	11,106	1,344,912	7,680	158,142	930	316,890	5,874	105,300
17	6,666	1,351,578	3,612	161,754	522	317,412	5,628	110,928
18	2,838	1,354,416	4,302	166,056	648	318,060	3,384	114,312
19	3,720	1,358,136	2,460	168,516	546	318,606	5,646	119,958
20	1,890	1,360,026	2,346	170,862			7,422	127,380
21	804	1,360,830	2,982	173,844			6,360	133,740
22	138	1,360,968	1,746	175,590			5,256	138,996
23			1,878	177,468			3,204	142,200
24			1,314	178,782			1,578	143,778
25			1,176	179,958			2,022	145,800
26			480	180,438			4,326	150,126
27							3,528	153,654
28							3,492	157,146
29							3,600	160,746
30							5,220	165,966
31							3,492	169,458
8/ 1							4,374	173,832
2							4,422	178,254
3							4,902	183,156
4							4,224	187,380
5							2,592	189,972
6							1,206	191,178
7							342	191,520
System Total		1,360,968		180,438		318,606		191,520

Table 19. Daily salmon escapement sonar counts by species, Nushagak River, Bristol Bay, 1983.[1/]

Date	Sockeye		King		Chum		Coho		Total	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/11	253	253	118	118					371	371
12	335	588	156	274					491	862
13	454	1,042	212	486					666	1,528
14	282	1,323	131	618					413	1,941
15	437	1,760	204	822					641	2,582
16	297	2,058	139	960					436	3,018
17	282	2,340	132	1,092					414	3,432
18	306	2,646	143	1,235					449	3,881
19	292	2,938	136	1,371					428	4,309
20	790	3,728	368	1,739					1,158	5,467
21	606	4,334	570	2,309	487	487			1,663	7,130
22	3,385	7,719	3,180	5,489	2,718	3,205			9,283	16,413
23	1,653	9,372	1,553	7,042	1,327	4,533			4,533	20,946
24	5,455	14,826	5,124	12,166	4,380	8,913			14,959	35,905
25	2,890	17,717	2,715	14,881	2,321	11,234			7,926	43,831
26	3,749	21,465	4,388	19,269	2,939	14,173			11,076	54,907
27	4,125	25,591	4,828	24,097	3,235	17,408			12,188	67,095
28	9,926	35,517	11,618	35,715	7,783	25,191			29,328	96,423
29	4,826	40,343	5,649	41,364	3,784	28,975			14,259	110,682
30	7,235	47,578	8,468	49,832	5,673	34,648			21,376	132,058
7/ 1	9,534	57,112	5,742	55,574	1,733	36,381			17,009	149,067
2	9,224	66,336	5,556	61,130	1,677	38,058			16,457	165,524
3	4,781	71,117	2,880	64,009	869	38,928			8,530	174,054
4	8,079	79,196	4,866	68,875	1,469	40,397			14,414	188,469
5	28,917	108,114	4,876	73,751	8,238	48,635	336	336	42,367	230,835
6	10,492	118,606	1,769	75,520	2,989	51,624	122	458	15,372	246,207
7	7,959	126,565	1,342	76,862	2,267	53,891	93	551	11,661	257,868
8	8,792	135,357	1,482	78,344	2,505	56,396	102	653	12,882	270,750
9	6,926	142,283	1,168	79,512	1,973	58,369	81	734	10,147	280,897
10	5,818	148,101	981	80,493	1,657	60,026	68	801	8,524	289,421
11	3,063	151,164	2,351	82,843	3,205	63,232	71	872	8,690	298,111
12	3,059	154,222	2,347	85,191	3,201	66,433	71	944	8,678	306,789
13	2,338	156,560	1,794	86,985	2,447	68,879	54	998	6,633	313,422
14	3,055	159,616	2,345	89,330	3,198	72,077	71	1,069	8,669	322,091
15	3,180	162,795	2,440	91,770	3,327	75,404	74	1,143	9,021	331,112
16	3,018	165,813	755	92,524	2,910	78,314		1,143	6,683	337,795
17	1,546	167,360	387	92,911	1,491	79,806		1,143	3,424	341,219
18	1,739	169,098	435	93,346	1,677	81,482		1,143	3,850	345,069
19	1,688	170,786	422	93,768	1,628	83,110		1,143	3,738	348,807
20	1,823	172,610	456	94,223	1,758	84,868		1,143	4,037	352,844
21	271	172,880	361	94,585	1,174	86,042	406	1,549	2,212	355,056
22	280	173,161	373	94,958	1,214	87,255	420	1,969	2,287	357,343
23	326	173,487	435	95,393	1,413	88,668	489	2,458	2,663	360,006
24	343	173,830	458	95,850	1,488	90,156	515	2,973	2,804	362,810
25	424	174,254	566	96,416	1,839	91,995	637	3,610	3,466	366,276
26	398	174,652	597	97,013	1,989	93,984	597	4,207	3,580	369,856
27	395	175,047	592	97,605	1,974	95,959	592	4,799	3,554	373,410
28	422	175,469	633	98,238	2,109	98,068	633	5,432	3,797	377,207
29	429	175,898	644	98,882	2,146	100,214	644	6,076	3,863	381,070
30	275	176,174	413	99,295	1,377	101,591	413	6,489	2,479	383,549
31		176,174	957	100,253	957	102,549		6,489	1,915	385,464
8/ 1		176,174	660	100,913	660	103,209		6,489	1,321	386,785
2		176,174	790	101,703	790	103,999		6,489	1,580	388,365
3		176,174	734	102,438	734	104,734		6,489	1,469	389,834
4		176,174	658	103,096	658	105,392		6,489	1,317	391,151
5		176,174	55	103,151	73	105,466	1,212	7,700	1,340	392,491
6		176,174	89	103,240	118	105,584	1,948	9,649	2,155	394,646
7		176,174	83	103,323	110	105,694	1,819	11,468	2,012	396,658
8		176,174	211	103,533	281	105,975	4,638	16,106	5,130	401,788
9		176,174	232	103,765	309	106,285	5,105	21,210	5,646	407,434
10	341	176,515		103,765		106,285	4,435	25,645	4,776	412,210
11	152	176,667		103,765		106,285	1,981	27,626	2,133	414,343
12	125	176,792		103,765		106,285	1,629	29,255	1,754	416,097
13	94	176,886		103,765		106,285	1,215	30,470	1,309	417,406
14	73	176,959		103,765		106,285	944	31,415	1,017	418,423
15	76	177,034		103,765		106,285	982	32,397	1,058	419,481
16	66	177,100		103,765		106,285	855	33,252	921	420,402
17	42	177,142		103,765		106,285	552	33,804	594	420,996
Total		177,142		103,765		106,285		33,804		420,996

1/ Post-season final sonar counts.

Table 20. Salmon aerial survey escapement estimates by species, district and river system, Bristol Bay, 1983. 1/

District and River System	Number of Fish 2/					
	Sockeye		King		Chum	
	Index	Total	Index	Total	Index	Total
NAKNEK-KVICHAK DISTRICT						
Kvichak River						
Branch River 3/		96,220	3,500		8,800	
Naknek River 3/			14,200		1,800	
Total		96,220	17,700		10,600	
EGEGIK DISTRICT						
Egegik River						
King Salmon River 4/	50		1,615		15,500	
Total	50		1,615		15,500	
UGASHIK DISTRICT						
Ugashik River (outlet)	9,400		50			
Mother Goose 5/	750		3,670		17,000	
Total	10,200		3,670		17,000	
NUSHAGAK DISTRICT						
Wood River						
Muklung River	2,300		1,830			
Igushik River						
Nuyakuk River 6/						
Nushagak River 7/	20,400		28,770			
Mulchatna River 8/	20,000		23,310			
Snake River	1,540	3,080				
Total	44,240	88,480	53,910	161,730		
TOGIAK DISTRICT						
Togiak River 9/	7,800	13,200	4,390		35,150	70,300
Ungalikthluk River 10/	1,860	3,720	1,340		7,660	15,320
Kulukak River 11/	11,150	26,970	2,460		12,960	25,920
Quigmy River			40		4,900	9,800
Matogak River	} 100	200	190		7,600	15,200
Osviak River			120		11,900	23,800
Slug River	2,000	4,000			1,210	4,200
Total	22,910	48,090	8,540	21,890	81,380	164,540
TOTAL BAY	77,400	232,790	85,435	183,620	124,480	164,540

1/ Detailed information on aerial survey derived escapements are published in annual summary reports.
2/ Aerial survey escapement estimates are categorized as: index - indices of total escapement; generally data is incomplete which will not allow determination of total escapement; total - aerial survey data is complete and does allow estimate of total escapement.
3/ Includes Paul's King Salmon and Big Creeks.
4/ Includes Contact, Takayoto and Gertrude Creeks.
5/ Includes King Salmon River and Pumice, Old and Painter Creeks.
6/ Below the counting tower.
7/ Includes Iowithla, Kokwok, Klutispaw, King Salmon and Chichitnok Rivers.
8/ Includes Stuyahok, Koktuli, Chilikadrotna Rivers, and Mosquito Creek.
9/ Includes Gechiak and Pungokepuk Creeks and Kashaiak, Narogurum and Ongivinuck Rivers.
10/ Includes Kukayachagak River
11/ Includes Kulukak Lake and Tithe Creek ponds.

Table 21. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Kvichak River, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish									
			Aerial Survey				River Test Fishing			
	Tower Count		Nakeen to Index	Index	Index to Tower	Total	Fish Per Index Pt.[1]	Index Pts.		Accumulative Escapement
Date	Daily	Accum.						Daily	Accum.	
6/19	0	0								
20	+	+								
21	+	+					132	2	2	+
22	+	+	+	+	+	+	132		2	+
23	+	+					132		2	+
24	+	+					132		2	+
25	+	+	+	0	+	+	132	1	3	+
26	+	1					171	472	475	82
27	3	3	30	+	+	30[2]	179	441	917	165
28	139	142	28	139	61	228	170	1,637	2,553	436
29	378	521	119	360	130	579	180	3,603	6,156	1,109
30	423	943	254	510	247	1,011	190	2,062	8,218	1,566
7/ 1	422	1,366					204	736	8,954	1,827
2	317	1,683	56	116	133	305[2]	205	115	9,069	1,867
3	96	1,779	9	41	22	72	196	1,011	10,080	1,976
4	87	1,865	42	32	39	113	184	420	10,500	1,937
5	100	1,965					187	274	10,774	2,010
6	47	2,012					187	297	11,071	2,070
7	42	2,054					185	1,053	12,124	2,243
8	156	2,210	73	472	54	599[2]	182	55	12,179	2,214
9	349	2,559					210	246	12,425	2,609
10	95	2,654					210	197	12,623	2,651
11	32	2,686					210	488	13,111	2,753
12	49	2,735					210	123	13,234	2,779
13	55	2,790								
14	63	2,853								
15	342	3,195								
16	222	3,417								
17	29	3,447								
18	40	3,487								
19	53	3,539								
20	19	3,558								
21	6	3,565								
22	4	3,569								
23	1	3,570								
Total		3,570							13,234	2,779

1/ Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

2/ Poor survey conditions.

Table 22. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Egegik River, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish							
	Tower Count		Aerial Survey		River Test Fishing			
					Fish Per	Index Pts.		Accumulative
Date	Daily	Accum.	Lagoon	Total	Index Pt. 1/	Daily	Accum.	Escapement
6/15			1	1		16	16	
16						20	36	
17					90	26	62	6
18					90	52	114	10
19					72	711	825	59
20					56	386	1,211	68
21	+	+			56	27	1,238	69
22	5	5	7	7	56	8	1,246	70
23	1	6			57	38	1,284	73
24	2	8			63	173	1,457	92
25	8	16	4	4	63	62	1,519	96
26	12	28			65	684	2,203	143
27	26	54	5	5	66	1,662	3,865	255
28	63	117	113	113	68	1,794	5,659	385
29	157	274			72	1,429	7,088	510
30	168	442	81	81	74	1,236	8,324	616
7/ 1	77	520			75	613	8,937	670
2	54	574			76	800	9,737	740
3	14	588			77	676	10,413	802
4	13	601			77	1,302	11,715	902
5	30	631			77	939	12,654	974
6	26	657			78	1,693	14,347	1,119
7	26	683			81	334	14,681	1,189
8	15	698			81	371	15,052	1,219
9	10	709			81	911	15,963	1,293
10	5	714	2	2	81	806	16,769	1,358
11	4	718						
12	5	723						
13	3	727						
14	6	733						
15	7	739						
16	2	741						
17	3	744						
18	7	751						
19	13	764						
20	9	774						
21	9	783						
22	4	787						
23	2	790						
24	2	792						
Total		792					16,769	1,358

1/ Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the

Table 23. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Ugashik River, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish								
	Tower Count		Aerial Survey			River Test Fishing			
Date	Daily	Accum.	Lagoon	River	Total	Fish Per Index Pt.[1]	Index Points Daily	Index Points Accum.	Accumulative Escapement
6/20	0	0					0	0	0
21	0	0				18	22	22	+
22	0	0				18	13	35	1
23	+	+				18	9	44	1
24	+	+				21	7	50	1
25	+	+				27	30	80	2
26	+	+				28	26	106	3
27	+	+				28	11	117	3
28	+	+				28	13	130	4
29	+	+				28	10	140	4
30	+	1				27	10	150	4
7/ 1	+	1	+	-	+	27	20	170	5
2	1	2				26	42	211	5
3	2	4				28	157	368	10
4	+	4				30	187	555	17
5	+	4				31	85	641	20
6	49	53				31	146	786	24
7	9	63				30	138	925	28
8	22	84	1	-	1	30	366	1,291	39
9	12	97				30	373	1,663	50
10	31	128	+	-	+	30	2,252	3,915	117
11	201	329				30	3,511	7,426	223
12	73	401				30	2,722	10,148	304
13	71	472				30	1,771	11,919	358
14	173	646				30	2,200	14,119	424
15	133	778				30	991	15,110	453
16	39	817				30	376	15,485	465
17	15	832							
18	10	842							
19	12	854							
20	15	869							
21	19	889							
22	13	901							
23	11	913							
24	6	919							
25	3	922							
26	5	927							
27	15	942							
28	14	955							
29	14	970							
30	13	982							
31	10	992							
8/ 1	5	997							
2	3	1,000							
3	+	1,001							
Total		1,001						15,485	465

1/ Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

Table 24. Daily sockeye salmon tower counts and aerial survey escapement estimates, Wood River, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish			
	Tower Count		Aerial Survey[1]	
Date	Daily	Accum.	Number	Comments
6/16	0	0		
17	0	0		
18	0	0		
19	0	0		
20	1	1		
21	2	2		
22	1	3	0	Good vis.; no sign of fish in lower river.
23	1	4		
24	2	7	+	Fair to good visibility.
25	1	7	0	Poor visibility.
26	16	24	0	Very poor visibility.
27	66	90	89	Poor vis.; est. total river at 100,000.
28	43	132	10	Poor visibility; no sign in lower river.
29	36	168	8	Poor visibility; no sign in lower river.
30	14	182	3	Fair to good vis.; no sign in lower river.
7/ 1	23	205	5	Very good vis.; no sign in lower river.
2	10	215	1	Fair visibility; no sign in lower river.
3	300	515	292	7:30 a.m. 12,000; 12:40 p.m. 172,000; 6:05 p.m. 292,000.
4	599	1,115	207	9:35 a.m. 207,000; 3:30 p.m. 70,000.
5	95	1,210	11	Poor visibility; no sign in lower river.
6	15	1,225		
7	13	1,238		
8	14	1,252		
9	20	1,272		
10	6	1,277		
11	3	1,280		
12	2	1,282		
13	2	1,285		
14	34	1,319		
15	15	1,334		
16	11	1,345		
17	7	1,352		
18	3	1,354		
19	4	1,358		
20	2	1,360		
21	1	1,361		
22	+	1,361		
Total		1,361		

1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

Table 25. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Igushik River, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish								
	Tower Count		Aerial Survey[1]			River Test Fishing			
						Fish Per	Index Pts.		Accumulative
Date	Daily	Accum.	Lagoon	River	Total	Index Pt.[2]	Daily	Accum.	Escapement
6/18						34	9	9	+
19						34	37	46	2
20						34	229	275	9
21	0	0				46	241	516	24
22	0	0	0	0	0	46	342	858	39
23	+	+	0	+	+	46	1,067	1,925	89
24	1	1	0	1	1	46	1,115	3,040	140
25	3	4	1	3	3	46	718	3,758	173
26	6	10	0	2	2	46	478	4,236	195
27	6	16	0	2	2	46	580	4,816	222
28	8	24	1	2	3	46	1,051	5,867	270
29	5	29	+	1	1	46	624	6,491	299
30	8	37	+	2	2	46	774	7,265	334
7/ 1	7	44	+	2	2	46	424	7,689	354
2	6	50				46	605	8,294	382
3	7	57	+	3	3	46	454	8,748	402
4	8	65	1	1	2	46	358	9,106	419
5	11	75	1	+	1	46	824	9,930	457
6	12	87	+	1	1	13	961	10,891	142
7	12	99				13	800	11,691	152
8	13	111	+	1	2	13	1,050	12,741	166
9	9	121				13	947	13,688	178
10	11	132				11	571	14,259	157
11	6	138				11	553	14,812	163
12	4	142				11	163	14,975	165
13	3	144				11	353	15,328	169
14	1	146							
15	5	150							
16	8	158							
17	4	162							
18	4	166							
19	2	169							
20	2	171							
21	3	174							
22	2	176							
23	2	177							
24	1	179							
25	1	180							
26	+	180							
Total		180						15,328	169

1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

2/ Fish per index point was originally based on the historic relationship (average of 30.7 fish per index point from 1976-82) between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

Table 26. Daily sockeye salmon sonar and tower counts and aerial survey escapement estimates, Nushagak/Nuyakuk Rivers, Bristol Bay, 1983.

	Escapement Enumeration Method in Thousands of Fish					
	Nushagak River Sockeye Salmon Sonar Count 1/		Nuyakuk River Sockeye Salmon Tower Count		Aerial Survey Black Pt. to Portage Cr. 2/	
Date	Daily	Accum.	Daily	Accum.	Number	Comments
6/21 >		4				
22	4	7				
23	2	9				
24	5	14				
25	3	17				
26	4	21				
27	4	25				
28	10	35				
29	5	40				
30	7	47	0	0	30,000	Fair vis., heavy kings mid-river.
7/ 1	10	57	0	0		
2	9	66	23	23		
3	5	71	27	50	100,000	Excellent visibility.
4	8	79	17	67	380,000	Ex. vis.; plus 63,000 to Iowithla R.
5	29	108	12	79		
6	10	118	7	86		
7	8	126	22	108		
8	9	135	66	175	4,000	Fair visibility.
9	7	142	54	229		
10	6	148	41	271		
11	3	151	21	292		
12	3	154	13	305		
13	2	156	5	310		
14	3	159	4	314		
15	3	163	2	316		
16	3	166	1	317		
17	0	166	1	317		
18	2	168	1	318		
19	2	170	1	319		
20	2	172				
21	+	172				
22	+	172				
23	+	172				
24	+	173				
25	+	173				
26						
27						
28						
29						
30						
Total		176		319		

1/ In-season preliminary sonar counts.
2/ Includes estimates of total salmon in clear water index areas in lower Nushagak River.

Table 27. Daily sockeye salmon tower counts and aerial survey escapement estimates, Togiak River, Bristol Bay, 1983.

			Enumeration Method in Thousands of Fish				
			Aerial Survey 1/				
	Tower Count		Togiak	Pungokepuk	Ongivinuck		
Date	Daily	Accum.	to Pung.	to Ongi.	to Tower	Total	Comments
6/26	+	+					
27	0	+					
28	0	+					
29	0	+					
30	1	1					
7/ 1	2	3					
2	4	7					
3	3	10					
4	1	12	1	2	1	4	Good visibility.
5	3	14					
6	5	20					
7	6	26					
8	6	32					
9	5	37					
10	5	42					
11	5	48					
12	9	57	7	9	3	19	Good to exc. vis.
13	15	71					
14	17	89					
15	11	99					
16	6	105					
17	6	111					
18	3	114					
19	6	120					
20	7	127					
21	6	134					
22	5	139					
23	3	142					
24	2	144					
25	2	146					
26	4	150					
27	4	154					
28	3	157					
29	4	161					
30	5	166					
31	3	169					
8/ 1	4	174					
2	4	178					
3	5	183					
4	4	187					
5	3	190					
6	1	191					
7	+	192					
Total		192					

1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

Table 28. Commercial salmon processors and buyers operating by district, Bristol Bay, 1983.[1/]

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
NAKNEK-KVICHAK DISTRICT							
1. A. Kemp Fisheries	M/V Bering Trader		Floater			Sea	
2. Al Lou's Fish.	Naknek			Shore			
3. Alaska Far East	Naknek		Shore		Air		
4. All Alaskan Seafoods	M/V All Alaskan		Floater				
5. Bumble Bee Seafoods	So. Naknek	3 1-lb.					
		2 ½-lb.	Shore				
6. Bristol Bay Coastal Fish.	Dillingham				Air		
7. Comeau Int'l. Sales	M/V Lady Pacific		Floater			Sea	
8. Daerim America	M/V Francis Lee			Floater			Con. w/Teddy
9. Dragnet Fisheries	King Salmon		Floater		Air		Con. w/Alaskan Fish.
10. Fish West Co.	M/V West I		Floater				
11. FTC Fish Co.	M/V Woodbine		Floater				
12. Icicle Seafoods	M/V Bering Star		Floater		Air		
13. Kenai Packers	So. Naknek				Air	Sea	Con. w/ Pedersen Pt.
14. Lang, R. L.	M/V Mary Lou		Floater				
15. Morpac, Inc.	M/V Galaxy		Floater				
16. Nelbro Packing Co.	Naknek	1 1-lb.					
		3 ½-lb.					
		1 ½-lb.	Shore			Sea	
17. North Coast Seafood Proc.	M/V Polar Bear		Floater				
18. Northern Peninsula Fish.	King Salmon				Air		
19. Northland Sea Products	M/V Northland		Floater				
20. Nuka Point Fisheries	M/V Marin I			Floater			
21. Nushagak Fisheries	M/V Double Star		Floater				
22. Ocean Fisheries	M/V Hawaiian Princess		Floater				
23. Oceanic Seafoods	M/V Pacific Harvest			Floater			
24. Pacific Star Seafoods	King Salmon				Air		
25. Pedersen Fisheries	M/V Polar Shell			Floater			
26. Pederson Pt. (KP)	Pederson Point		Shore			Sea	Con. w/Kenai Packers
27. Peter Pan Seafoods	M/V Baranof & Courageous		Floater			Sea	
28. Polar Ice Seafoods	M/V Polar Ice		Floater				
29. Queen Fisheries	Naknek				Air		Tender to Nushagak
30. Red Salmon Co.	Naknek	2 1-lb.					
		2 ½-lb.	Shore		Air		
31. Sea Alaska Products	So. Naknek	2 1-lb.					Frozen on Sea Alaska
		2 ½-lb.	Floater			Sea	and R. L. Resoff.
32. Sea Roe Fisheries	M/V Lafayette		Floater				
33. Snopac Products	M/V Snopac		Floater				
34. Speedwell, Inc.	M/V Speedwell		Floater				
35. Squanto Pacific	King Salmon				Air		
36. Sterling Seafoods	M/V Alaska Star		Floater				
37. Trident Seafoods	M/V Bountiful		Floater			Sea	
38. Ursin Seafoods	Great Alaskan		Floater				
39. Vanguard Fisheries	M/V Trident		Floater		Air		
40. Virgin Bay Kelp Co.	M/V Aleutial Dragon		Floater				
41. Walrus Island Seafoods	King Salmon				Air		
42. Western Seas Fish. Coop.	M/V Cape St. Elias		Floater			Sea	
43. Whitney Fidalgo Seafoods	Naknek	1 1-lb.	Floater		Air		Frozen on Yardarm
		1 ½-lb.					Knot.
Total Naknek-Kvichak District:		5	31	5	13	9	

(continued)

Table 28.[1/] (continued)

Name of Operator/Buyer	Base of Operations	Processing Method: Canned	Frozen	Cured	Export: Fresh	Brine	Comments
EGEGIK DISTRICT							
1. A. Kemp Fisheries	M/V Bering Trader		Floater				
2. All Alaskan Seafoods	M/V All Alaskan		Floater				
3. Big Creek Fish. & Pack.	Egegik				Air		
4. Bristol Bay Coastal Fish.	Dillingham				Air		
5. Bristol Monarch	M/V Bristol Monarch		Floater				
6. Bumble Bee Seafoods	So. Naknek		Floater				Tendered to So. Naknek for canning.
7. Comeau Int'l. Sales	M/V Lady Pacific		Floater				
8. Daerim America	M/V Francis Lee		Floater	Floater			
9. Diamond Beauty Seafoods	Egegik	1 1-lb. 2 ½-lb.	Shore			Sea	Some tendered to Kodiak for canning.
10. Dragnet Fisheries	King Salmon		Floater		Air		
11. Homer Seafoods	Egegik				Air		
12. Icicle Seafoods	Dillingham		Floater				Tendered to Nushagak.
13. Kenai Packers	So. Naknek				Air		
14. Nelbro Packing Co.	Naknek						Tendered to Naknek for canning.
15. North Coast Seafood Proc.	M/V Polar Bear		Floater				
16. Northern Peninsula Fish.	King Salmon				Air		
17. Northland Sea Products	M/V Northland		Floater				
18. Ocean Fisheries	M/V Hawaiian Princess		Floater				
19. Oceanic Seafoods Co.	M/V Pacific Harvester			Floater			
20. Pederson Fish.	M/V Polar Shell			Floater			
21. Pederson Point (KP)	Pederson Point		Shore				
22. Queen Fisheries	Dillingham						Tendered to Nushagak.
23. Red Salmon Co.	Naknek					Sea	Tendered to Naknek.
24. Sea Alaska Products	So. Naknek		Floater				Tendered to So. Naknek.
25. Sea Roe Fisheries	M/V Lafayette		Floater				
26. Snopac Products	M/V Snopac		Floater				
27. Sterling Seafoods	M/V Alaska Star		Floater				
28. Teddy Company	M/V Teddy		Floater				
29. Trident Seafoods	M/V Bountiful		Floater				
30. Ursin Seafoods	Great Alaskan		Floater				
31. Vanguard Fisheries	M/V Trident		Floater				
32. Virgin Bay Kelp Co.	M/V Aleutian Dragon		Floater				
33. Walrus Island Fisheries	King Salmon				Air		
34. Western Seas Fishermen's Coop. Assoc.	M/V Cape St. Elias		Floater				
35. Whitney-Fidalgo Seafoods	Naknek		Floater		Air		Tendered to Naknek.
Total Egegik District:		1	24	3	8	2	
UGASHIK DISTRICT							
1. A. Kemp Fisheries	M/V Bering Trader		Floater				
2. All Alaskan Seafoods	M/V All Alaskan		Floater				
3. Briggs-Way		1 5-oz. glass					
4. Bristol Monarch	M/V Bristol Monarch		Floater				
5. Comeau Int'l. Sales	M/V Lady Pacific		Floater			Sea	
6. Daerim America	M/V Francis Lee			Floater			
7. Diamond Beauty Seafoods	Egegik						Tendered to Egegik for canning.

(continued)

Table 28.[1/] (continued)

Name of Operator/Buyer	Base of Operations	Processing Method: Canned	Frozen	Cured	Export: Fresh	Brine	Comments
		UGASHIK DISTRICT (continued)					
8. Dragnet Fisheries	King Salmon		Floater		Air		
9. Fish West Co.	West I		Floater				
10. Icicle Seafoods	Dillingham		Floater				Tendered to Nushagak.
11. Northland Sea Products	M/V Northland		Floater				
12. Oceanic Seafoods Co.	M/V Pacific Harvester		Floater				
13. Pan Alaska Fisheries	M/V Royal Venture		Floater		Air	Sea	
14. Pedersen Fish.	M/V Polar Shell			Floater			
15. Sea Alaska Products	So. Naknek		Floater			Sea	Tendered to So. Naknek for canning.
16. Sea Fisher Sea Products	M/V Arctic Fisher		Floater				
17. Sea Roe Fisheries	M/V Lafayette		Floater				
18. Snopac Products	M/V Snopac		Floater				
19. Spindrift Fisheries	Ugashik				Air		
20. Sterling Seafoods	M/V Alaska Star		Floater				
21. Teddy Co.	M/V Teddy		Floater				
22. Trident Seafoods	M/V Bountiful		Floater				
23. Vanguard Fisheries	M/V Trident		Floater				
24. Whitney-Fidalgo Seafoods	Naknek		Floater		Air	Sea	Tendered to Naknek for canning.
Total Ugashik District:		1	19	2	4	4	
		NUSHAGAK DISTRICT					
1. A. Kemp Fisheries	Dillingham		Shore/ Floater				Frozen on M/V City of San Diego.
2. Alaska Far East Corp.	Naknek		Shore				
3. All Alaskan Seafoods	M/V All Alaskan		Floater				Frozen on M/V All Alaskan and Pacific Apollo.
4. Bristol Bay Coastal Fish.	Dillingham		Shore		Air		
5. Bristol Bay Coop. Marketing Ass'n.	Dillingham		Shore		Air		
6. Clark, Inc.	Dillingham		Shore		Air		
7. Columbia-Wards Fisheries	Ekuk	3 1-lb. 1 ½-lb.	Shore/ Floater				Frozen on M/V Double Star.
8. Comeau Int'l. Sales	M/V Nicolle N		Floater				
9. Dragnet Fisheries	Dillingham				Air		
10. Icicle Seafoods	Arctic Star		Floater		Air		
11. Kenai Packers	Dillingham				Air		Tendered to Pederson Pt. for freezing.
12. Moran Maritime	Dillingham				Air		
13. Morpac, Inc.	M/V Viceroy and Galaxy		Floater				
14. North Coast Seafood Proc.	M/V Polar Bear		Floater				
15. Northland Sea Products	M/V Northland		Floater				
16. Nuka Point Fisheries	Maren I			Floater			
17. Peter Pan Seafoods	Dillingham	2 1-lb. 2 ½-lb.			Air	Sea	Tendered to King Cove for canning.
18. Polar Ice Seafoods	M/V Polar Ice		Floater				
19. Queen Fisheries	Clarks Slough	1 1-lb. 2 ½-lb. 1 ¼-lb.			Air		
20. Sea Alaska Products	Clarks Point		Floater			Sea	Frozen on M/V Sea Alaska, Pacific Pride & Robert L. Resoff; tendered to Chignik for canning; formerly A.P.A.

(continued)

Table 28.[1/] (continued)

Name of Operator/Buyer	Base of Operations	Processing Method: Canned	Frozen	Cured	Export: Fresh	Brine	Comments
	NUSHAGAK DISTRICT (continued)						
21. Speedwell, Inc.	M/V Speedwell		Floater				
22. Sterling Seafoods	M/V Alaska Star		Floater				
23. Trident Seafoods	M/V Billikin, Tempest, Bountiful & Neptune		Floater				
24. Ursin Seafoods	Great Alaskan		Floater				
25. Waterkist Corp.	M/V Jo Linda		Floater				
26. Western Pioneer	M/V Western Pioneer		Floater				
27. Whitney-Fidalgo Seafoods	Naknek				Air		
28. Yupik'em	Dillingham				Air		Con. w/Bristol Bay Coastal Fish.
Total Nushagak District:		3	20	1	11	2	
	TOGIAK DISTRICT						
1. All Alaskan Seafoods	M/V All Alaskan		Floater				Tendered to Nushagak for freezing.
2. Bonanza, Inc.	Togiak				Air		
3. Bristol Bay Coastal Fish.	Dillingham		Shore				Flown to Dillingham for freezing.
4. Calista Emmonak Fish.	M/V Nushagak and Snowbird		Floater				
5. Clark, Inc.	Dillingham		Shore		Air		Flown to Dillingham for freezing, and air export out.
6. Nuka Point Fisheries	Maren I			Floater			
7. Sea Alaska Products	Clarks Point		Floater				Tendered to Clarks Pt. for freezing.
8. Speedwell, Inc.	M/V Speedwell		Floater				
9. Togiak Fisheries	Togiak	1 1-lb. 1 ½-lb.	Shore				
10. Trident Seafoods	Neptune		Floater				Tendered to Nushagak for freezing.
11. Ursin Seafoods	Great Alaskan		Floater				
12. Waterkist Corp.	M/V Jo Linda		Floater				
Total Togiak District:		1	10	1	2	0	

FISHERY OPERATOR SUMMARY

District	Number of Operators (Total)	Processing Method: Canned	Frozen	Cured	Export: Fresh	Brine	Number of Canning Lines[2/]: 1-lb.	1/2-lb.	1/4-lb.
Naknek-Kvichak	(43)	5	31	5	13	9	9	10	1
Egegik	(35)	1	24	3	8	2	1	2	
Ugashik	(24)	1	19	2	4	4			1
East Side	(52)	(7)	(38)	(5)	(17)	(13)	10	12	2
Nushagak	(28)	3	20	1	11	2	6	5	1
Togiak	(12)	1	10	1	2		1	1	
West Side	(31)	(4)	(22)	(1)	(12)	(2)	7	6	1
TOTAL BAY	62	11	46	5	23	13	17	18	3

1/ Indicates operators with either a physical plant or processing facility in a district or those operators from other areas buying fish and/or providing tender and support service for fishermen in districts away from the facility.

2/ Number of canning lines available for operation.

Table 29. Case pack and commercial production of frozen and cured salmon by species and district, Bristol Bay, 1983. 1/

Category by District	No. Operators	Pack and Production 2/ Sockeye	King	Chum	Pink	Coho	Total
I. CASE PACK (in 48 - 1 lb. talls)							
Naknek-Kvichak	5	503,868	867	8,697		202	513,634
Egegik	1	82,224	84	2,282			84,590
Ugashik	1	15				14	29
Nushagak	3	211,383	4,427	23,348	7	489	239,654
Togiak	1	2,900	800	12,900			16,600
Total		800,390	6,178	47,227	7	705	854,507
II. FROZEN (in pounds)							
Naknek-Kvichak	31	51,838,143	147,017	3/	5,760	879	51,991,799
Egegik	24	19,183,396	23,774	3/			19,207,170
Ugashik	19	15,481,109	72,643	3/		41,920	15,595,672
Nushagak	20	13,750,491	1,841,847	1,433,620	160	369,823	17,395,941
Togiak	10	3,178,945	638,356	939,232	9	3,268	4,759,810
Total		103,432,084	2,723,637	2,372,852	5,929	415,890	108,950,392
III. CURED (in pounds)							
Naknek-Kvichak	5	3,238,153	5,548	3/		595	3,244,296
Egegik	3	1,437,108	4,626	3/			1,441,734
Ugashik	2	35,232	180	3/			35,412
Nushagak	1	62,985	3,495	22,590			89,070
Togiak	1	271,570	8,410	243,415			523,395
Total		5,045,048	22,259	266,005		595	5,333,907
IV. TOTAL FROZEN AND CURED (in pounds)							
Naknek-Kvichak	36	55,076,296	152,565	3/	5,760	1,474	55,236,095
Egegik	26	20,620,504	28,400	3/			20,648,904
Ugashik	21	15,516,341	72,823	3/		41,920	15,631,084
Nushagak	21	13,813,476	1,845,342	1,456,210	160	369,823	17,485,011
Togiak	10	3,450,515	646,766	1,182,647	9	3,268	5,283,205
Total		108,477,132	2,745,896	2,638,857	5,929	416,485	114,284,299

1/ Includes only fish processed in Bristol Bay.
2/ Pack and production data extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.
3/ Included with sockeye production.

Table 30. Salmon transported out of the area for processing, by species and district, Bristol Bay, 1983. 1/

I. FRESH EXPORT BY AIR 2/ (in pounds)

District	No. Operators	Fresh/Brine Export Sockeye	King	Chum	Pink	Coho	Total
Naknek-Kvichak	13	15,030,943	19,783	3/	35	150	15,050,911
Egegik	8	6,238,769	44,502	3/		91,878	6,375,149
Ugahsik	4	471,704	119,806	3/		7,248	598,758
Nushagak	11	4,569,964	714,513	374,474		111,983	5,770,934
Togiak	2	329,652	79,446	178,062		37,323	624,483
Total	23	26,641,032	978,050	552,636	35	248,582	28,420,235

II. BRINE EXPORT BY SEA 2/3/ (in number of fish and pounds)

District	Number Operators	Number Tenders	Number Fish	Number Pounds
Naknek-Kvichak	9	49	2,970,036	16,647,590
Egegik	2	16	623,824	3,654,402
Ugashik	4	12	460,669	2,605,367
Nushagak	2	8	374,212	2,292,585
Togiak				
Total	13	85	4,428,741	25,199,944

1/ Includes all fish exported from Bristol Bay in either brine or refrigerated sea water by sea-going tenders, or by air transportation.

2/ Export information extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.

3/ Most processors report mixed sockeye and chums and complete specie breakdown is generally not available until fish are final processed.

Table 31. Average round weight of the commercial salmon catch, by species and district, Bristol Bay, 1983.

District	Average Round Weight in Pounds[1/]					
	Sockeye	King	Chum	Pink	Coho	Total
Naknek-Kvichak	5.52	20.81	6.05	4.25		
Egegik	5.82	20.19	6.70		6.68	
Ugashik	5.73	21.51	6.33		7.15	
Nushagak	5.87	20.96	6.43	3.28	6.52	
Togiak	6.65	20.69	7.56	3.78	7.14	
Weighted Average	5.66	20.91	6.61	3.65	6.62	
Total Weight of Catch, All Districts[2/]	211,007	4,205	9,696	1	768	225,678

1/ Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303) and "Bristol Bay Salmon Catch Reports" (BB-CF/301), and is weighted by the catch of each processor against the total catch.

2/ Total weight shown in thousands of pounds, and is derived from preliminary catch data.

Table 32. Price paid per pound and exvessel value of the commercial salmon catch, by species and district, Bristol Bay, 1983. 1/

I. PRICE PAID PER POUND

District	Average Price Paid Per Pound 2/				
	Sockeye	King	Chum	Pink	Coho
Naknek-Kvichak	$ .5933	$.6256	$.2812	$.1925	$.4025
Egegik	.6084	.6814	.3081	-	.4250
Ugashik	.6455	.6793	.3103	-	.4250
Nushagak	.6462	.7115	.2976	.1840	.3959
Togiak	.6578	.6173	.3074	.1500	.3023
Weighted Average	$ .6098	$.6874	$.2985	$.1610	$.3985

II. EXVESSEL VALUE

District	Total Exvessel Value in 1,000's of Dollars 3/					
	Sockeye	King	Chum	Pink	Coho	Total
Naknek-Kvichak	$ 69,805	$ 129	$ 554	$ +	$ +	$ 70,489
Egegik	23,867	67	256	0	61	24,250
Ugashik	12,361	126	213	0	24	12,723
Nushagak	20,090	2,079	1,122	+	209	23,499
Togiak	2,555	490	750	+	12	3,807
Total	$128,677	$2,891	$2,894	$ +	$ 306	$134,769

1/ Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303).

2/ Average price per pound derived from individual company price schedules and is weighted by the catch of each processor against the total catch.

3/ Preliminary catch in pounds times district average price; totals may not equal sum of district value due to rounding.

Table 33. Subsistence salmon catch by species, district and village area, Bristol Bay, 1983.

Area	Permits Issued	Number of Fish[1/] Sockeye	King	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT:							
Naknek system[2/]	213	11,400	900	300	100	800	13,500
Kvichak system:							
Levelock	19	4,800	100	100	200	100	5,300
Igiugig	3	3,300	+				3,300
Newhalen	21	16,500					16,500
Nondalton	39	29,400					29,400
Port Alsworth	20	4,700					4,700
Iliamna	32	7,300	+				7,300
Pedro Bay	16	10,400	+	+	+		10,400
Kokhanok	22	20,100	+	+			20,100
District Total	385	107,900	1,000	400	300	900	110,500
EGEGIK DISTRICT							
Egegik system[3/]	14	700	+			+	700
UGASHIK DISTRICT							
Ugashik system[4/]	8	500	+	+		100	600
NUSHAGAK DISTRICT							
Nushagak Bay[5/]	282	9,700	5,000	1,100	200	4,000	20,000
Wood system[6/]	22	1,600	100	100	+	100	1,900
Igushik system							
Manokotak	20	4,700	200	200		300	5,400
Nushagak system							
Portage Creek[7/]							
Ekwok	9	3,200	1,200	1,200		200	5,800
New Stuyahok	41	11,000	3,300	3,600	200	600	18,700
Koliganek	15	8,200	2,000	3,000		100	13,300
District Total	389	38,400	11,800	9,200	400	5,300	65,100
TOGIAK DISTRICT							
Togiak system[8/]	38	1,900	700	900	200	800	4,500
TOTAL BRISTOL BAY	834	149,400	13,500	10,500	900	7,100	181,400

1/ Catches rounded to nearest 100 fish.
2/ Includes the communities of Naknek, South Naknek and King Salmon.
3/ Includes the villages of Egegik and North Egegik.
4/ Includes the villages of Pilot Point and Ugashik.
5/ Includes the communities of Dillingham, Kanakanak, Clarks Point, Clarks Slough, (Queen), Ekuk, Igushik Beach and the Lewis Point fish camps.
6/ Includes the village of Aleknagik.
7/ Included in with Nushagak Bay catches.
8/ Includes the villages of Togiak and Twin Hills.

APPENDIX TABLES

Appendix Table 1. Forecast and inshore sockeye salmon return, Bristol Bay, 1964-83.

	Number of Fish in Thousands				Percent Deviation from Forecast		
	Forecast 1/			Inshore			
Year	FRI 2/	ADF&G 3/	Japanese 4/	Return 5/	FRI	ADF&G	Japanese
1964	19,300	17,400		10,938	- 43	- 37	
65 6/	26,500	27,780		53,129	+100	+ 91	
66	34,000	31,271		17,553	- 48	- 44	
67	21,500	13,749		10,353	- 52	- 25	
68	10,500	10,409		8,010	- 24	- 23	
1969	16,200	21,274		19,043	+ 18	- 10	
70	57,200	55,812		39,399	- 31	- 29	
71	18,100	15,170		15,825	- 13	+ 4	
72	6,600	9,744		5,400	- 18	- 45	
73	5,800	6,194	9,500	2,444	- 58	- 61	- 74
1974	3,900	5,004	7,600	10,966	+181	+119	+ 44
75	12,100	11,960	21,600	24,232	+100	+103	+ 12
76	9,800	11,969	22,300	11,539	+ 18	- 4	- 48
77	8,800	8,380	19,300	9,722	+ 10	+ 16	- 50
78	16,500	11,534	22,600	19,924	+ 21	+ 73	- 12
1979	14,740	22,650	22,300	39,904	+171	+ 76	+ 79
80		54,542	73,600	62,489		+ 15	- 15
81		26,700	26,800	34,475		+ 29	+ 29
82		34,625	28,300	22,250 7/		- 36	- 21
83		27,117	43,500	45,813 7/		+ 69	+ 5
Average Percent Forecast Deviation 8/					57	45	35

1/ Estimated Japanese immature/mature catch was not subtracted from either forecast until 1965.
2/ Forecast by Fisheries Research Institute based on purse seine data gathered south of Adak, and is not broken down by river system. Included North Peninsula and Bristol Bay sockeye salmon from 1960-64. Program was terminated in 1980.
3/ Inshore river system forecast by the Department is based on cycle analysis, smolt production and ratio of 2-ocean to 3-ocean age return.
4/ Inshore "forecast" by the Department is based on CPUE data from Japanese research vessels. The "forecasts" for 1973-79 are not forecasts as data for these years went into the regression model that was used to make a "forecast" for these same years. The values for 1980-83 are actual geometric mean forecasts based on prior years' data.
5/ Inshore Bristol Bay catch plus escapement.
6/ Togiak, Snake and Nushagak-Mulchatna systems included for the first time in forecast.
7/ Preliminary.
8/ Absolute deviation without regard to sign.

(Literature Cited: 1, 5, 6, 7, and 16)

Appendix Table 2. Forecast and inshore pink salmon return, Nushagak district, Bristol Bay, 1966-82. 1/

Year	Number of Fish in Thousands: Forecast 2/ Escapement/Return	Forecast 2/ Fry	Inshore 3/ Return	Percent Deviation from Forecast: Escape/Return	Percent Deviation from Forecast: Fry
1966	2,300		3,779	+ 64	
68	4,500		3,866	- 14	
1970	2,500		570	- 77	
72	1,400		126	- 91	
74	307		999	+225	
76	3,047		1,603	- 47	
78	3,193		13,735	+330	
1980	15,700		4,988	- 68	
82	9,200	2,752	2,943 4/	- 68	+ 7
Average Percent Forecast Deviation 5/				109	

1/ Includes even-years only.
2/ Forecast based on escapement/return data from Nushagak/Nuyakuk River system and beginning in 1982, total fry production from Nushagak/Nuyakuk systems.
3/ Inshore Nushagak district catch plus escapement.
4/ Preliminary.
5/ Absolute deviation without regard to sign.

(Literature Cited: 1, 5 and 6)

Appendix Table 3. Commercial salmon catch by the Japanese mothership and land-based drift net high seas fisheries, by species, 1964-1983. 1/

	Number of Fish in Thousands											
	Sockeye		King		Chum		Pink		Coho		Total	
Year	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB
1964	7,097	108	410	195	8,641	8,956	2,281	17,247	3,535	1,624	21,964	28,130
65	12,038	159	185	93	6,036	8,330	4,429	29,142	1,177	1,913	23,865	39,637
66	7,254	703	208	112	8,562	11,848	2,553	16,032	469	1,458	19,046	30,153
67	8,087	2,566	128	110	6,837	11,078	7,781	23,051	226	1,329	23,059	38,134
68	6,373	2,769	362	88	8,107	8,457	3,823	15,899	898	1,421	19,563	28,634
1969	5,935	2,495	554	83	7,721	4,908	6,972	23,610	1,306	3,328	22,488	34,424
70	6,944	2,966	437	101	9,638	6,585	1,726	13,403	180	2,259	18,925	25,314
71	3,554	3,026	206	134	9,968	6,250	8,202	16,977	454	2,373	22,384	28,760
72	3,184	3,711	261	103	13,373	8,598	3,795	14,839	614	2,421	21,227	29,672
73	2,613	3,308	119	162	7,857	7,614	12,018	20,650	989	3,794	23,596	35,528
1974	2,282	3,155	361	186	9,283	12,179	7,756	11,242	1,085	3,559	20,767	30,321
75	2,171	2,969	162	135	7,367	11,480	14,654	15,347	356	3,550	24,710	33,481
76	2,266	3,291	283	201	10,436	10,646	7,207	10,879	828	2,751	21,020	26,690
77	1,508	1,289	93	146	5,996	6,230	9,100	15,041	79	1,722	16,776	24,428
78	1,882	1,292	105	210	3,802	3,488	1,853	7,846	609	2,512	8,251	15,349
1979	2,186	756	126	161	3,277	2,661	3,405	11,190	281	1,199	9,275	15,967
80	2,412	787	704	160	3,098	2,697	561	11,612	656	1,205	7,431	16,461
81	2,224	859	88	190	2,539	2,509	4,094	11,292	615	1,209	9,560	16,059
82	1,738	723	107	165	3,217	2,930	1,654	11,035	1,183	1,201	7,899	16,054
83 2/	1,655	828	87	178	3,081	2,395	4,324	11,308	297	1,122	9,445	15,831
20 Year Total	83,403	37,760	4,986	2,913	138,836	139,839	108,188	307,642	15,837	41,950	351,251	530,104
1964-73 Total	63,079	21,811	2,870	1,181	86,740	82,624	53,580	190,850	9,848	21,920	216,117	318,386
1974-83 Total	20,324	15,949	2,116	1,732	52,096	57,215	54,608	116,792	5,989	20,030	135,134	211,718
20 Year Average	4,170	1,888	249	146	6,942	6,992	5,409	15,382	792	2,098	17,563	26,505
1964-73 Average	6,308	2,181	287	118	8,674	8,262	5,358	19,085	985	2,192	21,612	31,839
1974-83 Average	2,032	1,595	212	173	5,210	5,722	5,461	11,679	599	2,003	13,513	21,172

1/ Mothership fishery (MS) and land-based fishery (LB).
2/ Preliminary.

(Literature Cited: 1 and 20)

Appendix Table 4. Japanese mothership commercial catch of maturing and immature sockeye salmon of Bristol Bay origin, 1964-83.

Year	Number of Fish in Thousands		
	Matures 1/	Immatures 2/	Total
1964	254	843	1,097
65	6,100	404	6,504
66	1,531	56	1,587
67	866	21	887
68	864	791	1,655
1969	1,240	517	1,757
70	3,451	1,207	4,658
71	842	592	1,434
72	710	214	924
73	625	259	884
1974	251	708	959
75	645	222	867
76	779	228	1,007
77	540	328	868
78	124	236	360
1979	68	410	478
80	180	681	861
81	137	380	517
82	63	228	291
83 3/	96	240	336
20 Year Total	19,366	8,565	27,931
1964-73 Total	16,483	4,904	21,387
1974-83 Total	2,883	3,661	6,544
20 Year Average	968	428	1,397
1964-73 Average	1,648	490	2,139
1974-83 Average	288	366	654

1/ Includes May and June 1-10 catches east of 170 degrees east, June 11-20 catches east of 175 degrees east, and June 21-30 catches east of 180 degrees.

2/ Includes sockeye salmon taken on the high seas at times and in areas where immature Bristol Bay sockeye salmon are in large majority. These are mostly .2 ocean age fish that otherwise would be expected to mature and return to Bristol Bay as .3 ocean fish. Includes July and August catches east of 170 degrees east, and June 21-30 catches between 170 degrees east and 180 degrees east.

3/ Preliminary.

(Literature Cited: 1 and 20)

Appendix Table 5. Inshore domestic and Japanese mothership high seas commercial catch of sockeye salmon of Bristol Bay origin, 1964-83.

	Number of Fish in Thousands						
	Bristol Bay Catch			Bristol Bay		Percent Japanese Catch of:	
Year	Inshore	Japanese 1/	Total	Escapement	Total Return 2/	Total Catch	Total Bay Run
1964	5,596	314	5,910	5,341	11,251	5	3
65	24,255	6,943	31,198	28,873	60,071	22	12
66	9,314	1,935	11,249	8,239	19,488	17	10
67	4,331	922	5,253	6,022	11,275	18	8
68	2,793	885	3,678	5,217	8,895	24	10
1969	6,622	2,031	8,653	12,421	21,074	24	10
70	20,721	3,968	24,689	18,679	43,368	16	9
71	9,584	2,049	11,633	6,241	17,874	18	12
72	2,416	1,302	3,718	2,984	6,702	35	19
73	761	839	1,600	1,683	3,283	52	26
1974	1,362	510	1,872	9,603	11,475	27	4
75	4,899	1,353	6,252	19,333	25,585	23	5
76	5,619	1,001	6,620	5,920	12,540	15	8
77	4,878	768	5,646	4,844	10,490	14	7
78	9,928	452	10,380	9,996	20,376	4	2
1979	21,429	304	21,733	18,475	40,208	1	1
80	23,762	590	24,352	38,727	63,079	2	1
81	25,603	818	26,421	8,872	35,293	3	2
82	15,146 3/	443	15,589	7,104	22,693	3	2
83	37,277 3/	324 3/	37,601	8,536	46,137	1	1
20 Year Total	236,297	27,751	264,047	227,110	491,157		
1964-73 Total	86,393	21,188	107,581	95,700	203,281		
1974-83 Total	149,904	6,563	156,466	131,410	287,876		
20 Year Average	11,815	1,388	13,202	11,356	24,558	11	6
1964-73 Average	8,639	2,119	10,758	9,570	20,328	20	10
1974-83 Average	14,990	656	15,647	13,141	28,788	4	2

1/ Includes immature fish caught in previous year.
2/ Includes Bristol Bay catch and escapement and Japanese catch.
3/ Preliminary

(Literature Cited: 1, 5, and 20)

Appendix Table 6. Japanese mothership commercial catch of king salmon of western Alaska origin, 1964-83.

Year	Number of Fish in Thousands		
	Total Mothership Catch	Catch of Western Alaska Origin	
		Number	Percent
1964	410	253	62
65	185	106	57
66	208	112	54
67	128	70	55
68	362	226	62
1969	554	435	79
70	437	345	79
71	206	144	70
72	261	170	65
73	119	47	39
1974	361	287	80
75	162	109	67
76	283	168	59
77	93	65	70
78	105	31	30
1979	126	65	52
80	704	380	54
81	88	26	30
82	107	43	40
83 1/	87	24	28
20 Year Total	4,986	3,106	
1964-73 Total	2,870	1,908	
1974-83 Total	2,116	1,198	
20 Year Average	249	155	62
1964-73 Average	287	191	67
1974-83 Average	212	120	57

1/ Preliminary.

(Literature Cited: 1 and 20)

Appendix Table 7. Offshore test fishing catch indices at Port Moller and the inshore total run of sockeye and chum salmon, Bristol Bay, 1968-83. 1/

Year	Number of Stations Fished	Catch	Catch Indices 2/ Actual	Catch Indices 2/ Adjusted	Total Inshore Run 3/	Number Fish Per Adj. Index Pt.
			SOCKEYE SALMON			
1968	128	522	227	299	8,010	26,800
69	101	1,287	549	728	19,043	26,200
70	98	1,033	603	824	39,399	47,800
71	84	858	545	654	15,825	24,200
72	69	120	66	95	5,400	56,900
1973	65	424	214	340	2,444	7,200
75	91	1,968	923	1,289	24,232	18,800
76	131	1,353	634	689	11,539	16,800
77	87	1,204	583	782	9,722	12,400
78	93	525	265	480	19,924	41,500
1979	85	1,422	827	1,034	39,904	38,600
80	151	782	411	527	62,489	118,600
81	109	1,311	684	1,051	34,475	32,800
82	118	1,150	612	759	22,250 4/	29,300
83	131	1,134	511	645	45,813 4/	71,000
			CHUM SALMON			
1968	128	175	84	93	812	8,700
69	101	132	63	78	548	7,000
70	98	169	78	106	1,232	11,600
71	84	124	69	86	1,132	13,200
72	69	100	55	66	1,022	15,500
1973	65	175	83	142	1,047	7,400
75	91	102	48	74	519	7,000
76	131	409	197	214	2,221	10,400
77	87	400	195	275	2,703	9,800
78	93	166	85	135	1,847	13,700
1979	85	50	26	32	1,366	43,200
80	151	421	222	276	2,685	9,700
81	109	392	186	218	2,013	9,200
82	118	325	176	208	1,284 4/	6,200
83	131	100	48	54	1,796 4/	33,300

1/ Program not operated in 1974.
2/ Indices expressed in fish/100 fathoms hours. Adjusted indices include linear estimates for unfished stations and days.
3/ Inshore catch and escapement in thousands of fish. Chum salmon escapement estimates from Nushagak and Togiak districts only.
4/ Preliminary.

(Literature Cited: 1, 5, 11 and 13)

Appendix Table 8. Salmon fishing license and entry permit registration by gear type and residency, Bristol Bay, 1964-83. 1/

Year	Drift Net 2/			Set Net 2/			Total
	Resident	Non-Resident	Total	Resident	Non-Resident	Total	
1964	947	689	1,636	793	137	930	2,566
65	916	677	1,593	868	125	993	2,586
66	1,019	846	1,865	826	139	965	2,830
67	965	734	1,699	686	144	830	2,529
68	973	711	1,684	722	117	839	2,523
1969	1,110	818	1,928	804	166	970	2,898
70	1,057	824	1,881	747	143	890	2,771
71	1,034	831	1,865	710	136	846	2,711
72	993	771	1,764	722	132	854	2,618
73 3/	2,041	1,162	3,203	902	108	1,010	4,213
1974 4/	634(634)	238(238)	872	530(530)	95(95)	625	1,497
75	1,217(450)	843(194)	2,060	751(159)	169(45)	920	2,980
76	987(69)	734(30)	1,721	625(5)	139(0)	764	2,485
77	999(52)	729(13)	1,728	684(15)	156(1)	840	2,568
78	1,039(66)	738(11)	1,777	749(16)	161(3)	910	2,687
1979	1,046(73)	754(10)	1,800	764(19)	170(5)	934	2,734
80	1,060(92)	767(18)	1,827	760(29)	187(5)	947	2,774
81	1,056(89)	771(18)	1,827	754(37)	202(5)	956	2,783
82	1,050(85)	774(15)	1,824	744(36)	213(5)	957	2,781
83	1,071(79)	750(16)	1,821	740(33)	220(3)	960	2,781
20 Year Total	21,214	15,161	36,375	14,881	3,059	17,940	54,315
1964-73 Total	11,055	8,063	19,118	7,780	1,347	9,127	28,245
1974-83 Total	10,159	7,098	17,257	7,101	1,712	8,813	26,070
20 Year Average	1,061	758	1,819	744	153	897	2,716
1964-73 Average	1,106	806	1,912	778	135	913	2,825
1974-83 Average	1,016	710	1,726	710	171	881	2,607

1/ Total license/permit registration; not all license/permittee's actually fished.
2/ Allowable gear per license/permit is 150 fathoms for drift and 50 fathoms for set with the following exceptions: 1968 and 1975 - 75 F. drift and 25 F. set; 1969 - 125 F. drift; 1973 - 25 F. drift and 12 1/2 F. set.
3/ Sliding gear scale in effect.
4/ Limited Entry went into effect. Figures in parenthesis are interim-use permits, and are included in the totals.

(Literature Cited: 2 and 15)

Appendix Table 9. Salmon fishing interim-use and permanent entry permits actually fished, by gear type, Bristol Bay, 1975-83.

Year	Number Permits Issued 1/			Number Permits Fished	
	Interim-Use	Permanent	Total	Number	Percent
DRIFT GILL NET					
1975	644	1,416	2,060	1,195	58
76	99	1,622	1,721	1,288	75
77	65	1,663	1,728	1,287	74
78	77	1,700	1,777	1,490	84
79	83	1,717	1,800	1,610	89
1980	110	1,717	1,827	1,670	91
81	107	1,720	1,827	1,667	91
82 2/	100	1,724	1,824	1,791	98
83 2/	95	1,726	1,821	3/	
Average	153	1,667	1,820	1,500	82
SET GILL NET					
1975	204	716	920	409	44
76	5	759	764	471	62
77	16	824	840	478	57
78	19	891	910	610	67
79	24	910	934	718	77
1980	34	913	947	754	80
81	42	914	956	744	78
82 2/	41	916	957	859	90
83 2/	36	924	960	3/	
Average	47	863	910	630	70
TOTAL DRIFT/ SET GILL NET					
1975	848	2,132	2,980	1,604	54
76	104	2,381	2,485	1,759	71
77	81	2,487	2,568	1,765	69
78	96	2,591	2,687	2,100	78
79	107	2,627	2,734	2,328	85
1980	144	2,630	2,774	2,424	87
81	149	2,634	2,783	2,411	87
82 2/	141	2,640	2,781	2,650	95
83 2/	131	2,650	2,781	3/	
Average	200	2,530	2,730	2,130	78

1/ Number of permanent permits include unrenewed permits.
2/ Preliminary.
3/ Number of permits fished not available.

(Literature Cited: 15)

Appendix Table 10. Sockeye salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	2,243,701	1,103,935	576,768	1,420,940	250,775	5,596,120
65	19,139,567	3,179,559	925,690	793,323	217,100	24,255,239
66	5,397,538	2,101,174	445,458	1,170,271	199,799	9,314,240
67	2,337,226	1,070,942	163,744	657,711	101,107	4,330,730
68	1,216,858	671,554	82,457	749,281	72,699	2,792,849
1969	4,655,072	889,322	169,845	773,207	134,252	6,621,698
70	17,803,805	1,403,509	171,541	1,188,534	153,377	20,720,766
71	5,857,378	1,306,682	954,068	1,256,799	209,060	9,583,987
72	1,102,365	839,820	17,440	381,347	75,261	2,416,233
73	168,249	221,337	3,920	272,093	95,723	761,322
1974	538,163	172,253	2,151	510,571	139,341	1,362,479
75	3,085,416	964,024	14,558	645,902	188,914	4,898,814
76	2,547,276	1,329,788	174,923	1,265,422	301,883	5,619,292
77	2,167,214	1,780,567	92,623	619,025	218,451	4,877,880
78	5,123,668	1,207,294	7,995	3,137,166	452,016	9,928,139
1979	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
80	15,120,457	2,623,066	885,875	4,497,787	634,561	23,761,746
81	10,992,809	4,361,406	2,116,066	7,493,093	639,707	25,603,081
82 1/	4,987,922	2,413,935	1,161,117	5,998,830	583,701	15,145,505
83 1/	21,314,327	6,740,310	3,341,978	5,296,322	584,092	37,277,029
20 Year Total	140,790,837	36,637,809	11,699,335	41,454,971	5,712,803	236,295,755
1964-73 Total	59,921,759	12,787,834	3,510,931	8,663,507	1,509,153	86,393,184
1974-83 Total	80,869,078	23,849,975	8,188,404	32,791,464	4,203,650	149,902,571
20 Year Average	7,039,542	1,831,890	584,967	2,072,749	285,640	11,814,788
1964-73 Average	5,992,176	1,278,783	351,093	866,351	150,915	8,639,318
1974-83 Average	8,086,908	2,384,998	818,840	3,279,146	420,365	14,990,257

1/ Preliminary.

(Literature Cited: 1 and 5)

Appendix Table 11. King salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	12,902	3,618	3,694	108,606	10,716	139,536
65	9,793	2,313	4,042	85,910	10,909	112,967
66	5,456	1,949	1,916	58,184	9,967	77,472
67	3,705	2,285	1,582	96,240	13,381	117,193
68	6,398	3,472	2,153	78,201	13,499	103,723
1969	19,016	2,801	2,107	80,803	20,181	124,908
70	19,037	3,765	1,498	87,547	28,664	140,511
71	10,254	2,187	779	82,769	27,026	123,015
72	2,262	1,097	166	46,045	19,976	69,546
73	951	1,475	292	30,470	10,856	44,044
1974	480	1,133	1,200	32,053	10,798	45,664
75	964	237	111	21,454	7,226	29,992
76	4,064	1,138	338	60,684	29,744	95,968
77	4,373	3,694	2,167	85,074	35,218	130,526
78	6,930	3,126	5,935	118,548	57,000	191,539
1979	10,415	5,547	9,568	157,321	30,022	212,873
80	7,517	5,610	4,900	64,958	12,543	95,528
81	11,048	5,468	3,416	193,461	23,911	237,304
82 1/	12,503	4,984	7,078	200,057	39,997	264,619
83 1/	9,942	4,843	8,608	139,400	38,360	201,153
20 Year Total	158,010	60,742	61,550	1,827,785	449,994	2,558,081
1964-73 Total	89,774	24,962	18,229	754,775	165,175	1,052,915
1974-83 Total	68,236	35,780	43,321	1,073,010	284,819	1,505,166
20 Year Average	7,901	3,037	3,078	91,389	22,500	127,904
1964-73 Average	8,977	2,496	1,823	75,478	16,518	105,292
1974-83 Average	6,824	3,578	4,332	107,301	28,482	150,517

1/ Preliminary.

(Literature Cited: 1 and 5)

Appendix Table 12. Chum salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	153,644	23,496	30,688	463,309	131,371	802,508
65	45,430	11,188	14,971	177,434	111,521	360,544
66	57,273	32,085	29,100	129,344	95,410	343,212
67	49,606	11,039	14,104	338,286	63,322	476,357
68	43,187	16,193	17,624	178,786	108,001	363,791
1969	42,535	7,835	1,995	214,235	66,389	332,989
70	120,279	43,854	17,969	435,033	100,711	717,846
71	151,465	27,073	14,506	360,015	123,847	676,906
72	115,737	42,172	9,689	310,126	178,885	656,609
73	123,610	23,034	6,092	336,331	195,431	684,498
1974	41,347	4,022	2,334	157,941	80,710	286,354
75	79,740	4,094	1,634	152,891	87,058	325,417
76	317,550	46,955	9,924	801,064	153,559	1,329,052
77	340,228	83,121	4,456	899,701	270,649	1,598,164
78	185,451	44,480	1,449	651,743	274,967	1,158,090
1979	196,398	38,004	12,174	440,279	219,942	906,797
80	204,515	78,556	36,343	681,930	299,682	1,301,026
81	355,943	87,581	36,275	795,143	229,886	1,504,828
82 1/	194,256	82,040	50,283	456,441	159,136	942,156
83 1/	325,884	123,860	108,374	586,166	322,670	1,466,954
20 Year Total	3,144,078	830,682	419,993	8,566,198	3,273,147	16,234,098
1964-73 Total	902,766	237,969	156,738	2,942,899	1,174,888	5,415,260
1974-83 Total	2,241,312	592,713	263,255	5,623,299	2,098,259	10,818,838
20 Year Average	157,204	41,534	21,000	428,310	163,657	811,705
1964-73 Average	90,277	23,797	15,674	294,290	117,489	541,526
1974-83 Average	224,131	59,271	26,326	562,330	209,826	1,081,884

1/ Preliminary.

(Literature Cited: 1 and 5)

Appendix Table 13. Pink salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	49,127	606	18	1,497,817	2,001	1,549,569
65	514			95	91	700
66	142,221	8	11	2,337,066	13,545	2,492,851
67	20			265	829	1,114
68	218,732	211		1,705,150	11,743	1,935,836
1969	205	5	1	263	1,396	1,870
70	28,301	41		417,834	10,735	456,911
71	2			37	173	212
72	57,074	12		67,953	1,984	127,023
73	109		1	61	216	387
1974	508,534	4,405	340	413,613	13,086	939,978
75	6	9	2	126	279	422
76	264,631	4,121	116	739,590	28,085	1,036,543
77	19		5	3,017	1,476	4,517
78	734,880	11,430	530	4,348,336	57,524	5,152,700
1979	134	6	9	1,787	1,913	3,849
80	288,363	2,476	51	2,202,545	70,033	2,563,468
81	194	222	29	345	6,490	7,280
82 1/	125,869	1,973	14	1,285,947	23,660	1,437,463
83 1/	15			120	255	390
20 Year Total 2/	2,417,732	25,283	1,080	15,045,851	232,396	17,692,342
1964-73 Total	495,455	878	29	6,025,820	40,008	6,562,190
1974-83 Total	1,922,277	24,405	1,051	8,990,031	192,388	11,130,152
20 Year Average 2/	241,773	2,528	108	1,504,585	23,240	1,769,234
1964-73 Average	99,091	176	6	1,205,164	8,002	1,312,438
1974-83 Average	384,455	4,881	210	1,798,006	38,478	2,226,030

1/ Preliminary.
2/ Includes even-years only.

(Literature Cited: 1 and 5)

Appendix Table 14. Coho salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	3,133	775	380	26,416	5,859	36,563
65	3,053	945	713	2,851	521	8,083
66	4,096	1,932	533	11,517	15,864	33,942
67	1,175	1,044	1,901	31,517	18,159	53,796
68	7,357	6,507	5,771	48,867	24,872	93,374
1969	17	5,548	9,292	37,799	28,720	81,376
70	53	7,027	1,695	3,688	2,027	14,490
71	89	923	469	8,036	3,192	12,709
72	402	1,249		3,654	8,652	13,957
73	255	2,701	2,307	28,709	23,070	57,042
1974	916	1,156	4,055	12,569	25,049	43,745
75	43	951	4,595	7,342	33,350	46,281
76	1,195	2,321	3,561	6,778	12,791	26,646
77	2,883	2,685	3,884	52,562	45,201	107,215
78	913	2,256	2,024	44,740	44,338	94,271
1979	12,355	15,148	17,886	129,607	119,403	294,399
80	7,802	22,537	19,419	147,726	151,000	348,484
81	1,229	32,759	30,220	220,290	29,207	313,705
82 1/	9,111	72,185	51,176	387,801	142,952	663,225
83 1/	82	21,585	7,797	80,858	5,681	116,003
20 Year Total	56,159	202,234	167,678	1,293,327	739,908	2,459,306
1964-73 Total	19,630	28,651	23,061	203,054	130,936	405,332
1974-83 Total	36,529	173,583	144,617	1,090,273	608,972	2,053,974
20 Year Average	2,808	10,112	8,384	64,666	36,995	122,965
1964-73 Average	1,963	2,865	2,306	20,305	13,094	40,533
1974-83 Average	3,653	17,358	14,462	109,027	60,897	205,397

1/ Preliminary.

(Literature Cited: 1 and 5)

Appendix Table 15. Total salmon commercial catch by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	2,462,507	1,132,430	611,548	3,517,089	400,722	8,124,296
65	19,198,357	3,194,005	945,416	1,059,613	340,142	24,737,533
66	5,606,584	2,137,148	477,018	3,706,382	334,585	12,261,717
67	2,391,732	1,085,310	181,331	1,124,019	196,798	4,979,190
68	1,492,532	697,937	108,005	2,760,285	230,814	5,289,573
1969	4,716,845	905,511	183,240	1,106,307	250,938	7,162,841
70	17,971,475	1,458,196	192,703	2,132,636	295,514	22,050,524
71	6,019,188	1,336,865	969,822	1,707,656	363,298	10,396,829
72	1,277,840	884,350	27,295	809,125	284,758	3,283,368
73	293,174	248,547	12,612	667,664	325,296	1,547,293
1974	1,089,440	182,969	10,080	1,126,747	268,984	2,678,220
75	3,166,169	969,315	20,900	827,715	316,827	5,300,926
76	3,134,716	1,384,323	188,862	2,873,538	526,062	8,107,501
77	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
78	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
1979	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
80	15,628,654	2,732,245	946,588	7,594,946	1,167,819	28,070,252
81	11,361,223	4,487,436	2,186,006	8,702,332	929,201	27,666,198
82 1/	5,329,661	2,575,117	1,269,668	8,329,076	949,446	18,452,968
83 1/	21,650,250	6,890,598	3,466,757	6,102,866	951,058	39,061,529
20 Year Total	146,568,034	37,756,922	12,349,683	68,164,248	10,421,366	275,260,323
1964-73 Total	61,430,234	13,080,299	3,708,990	18,590,776	3,022,865	99,833,164
1974-83 Total	85,137,800	24,676,693	8,640,693	49,573,472	7,398,501	175,427,159
20 Year Average	7,328,402	1,887,850	617,484	3,408,212	521,068	13,763,016
1964-73 Average	6,143,023	1,308,030	370,899	1,859,078	302,297	9,983,316
1974-83 Average	8,513,780	2,467,669	864,069	4,957,347	739,850	17,542,716

1/ Preliminary.

(Literature Cited: 1 and 5)

Appendix Table 16. Commercial salmon catch in percent by gear type and species, Bristol Bay, 1962-81.

	Catch in Percent by Gear Type and Species											
	Sockeye		King		Chum		Pink		Coho		Total	
Year	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1962	84	16	93	7	90	10	85	15	65	35	84	16
63	84	16	93	7	85	15	53	47	47	53	86	14
64	86	14	94	6	86	14	88	12	70	30	86	14
65	92	8	94	6	88	12	88	12	56	44	92	8
66	89	11	95	5	87	13	89	11	76	24	89	11
1967	89	11	97	3	96	4	74	26	81	19	90	10
68	90	10	98	2	95	5	89	11	76	24	90	10
69	88	12	96	4	95	5	84	16	75	25	89	11
70	93	7	94	6	94	6	82	18	45	55	93	7
71	90	10	98	2	94	6	85	15	64	36	90	10
1972	93	7	98	2	95	5	75	25	84	16	93	7
73	92	8	97	3	96	4	86	14	75	25	93	7
74	79	21	97	3	95	5	89	11	75	25	84	16
75	91	9	96	4	94	6	61	39	80	20	91	9
76	90	10	94	6	96	4	89	11	63	37	91	9
1977	89	11	96	4	96	4	88	12	83	17	90	90
78	88	12	97	3	95	5	89	11	76	24	89	11
79	87	13	94	6	92	8	73	27	79	21	88	12
80	86	14	89	11	91	9	88	12	78	22	86	14
81	84	16	92	8	92	8	67	33	73	27	85	15
20 Year Total	1,764	236	1,902	98	1,852	148	863 1/	137 1/	1,421	579	1,779	221
1962-71 Total	885	105	952	48	910	90	433	67	655	345	889	111
1972-81 Total	879	121	950	50	942	58	430	70	766	234	890	110
20 Year Average	88	12	95	5	93	7	86 1/	14 1/	71	29	89	11
1962-71 Average	89	11	95	5	91	9	87	13	66	34	89	11
1972-81 Average	88	12	95	5	94	6	86	14	77	23	89	11

1/ Includes even-years only.

(Literature Cited: 5)

Appendix Table 17. Commercial salmon catch in percent by gear type and district, Bristol Bay, 1962-81. 1/

	Catch in Percent by Gear Type and District											
	Naknek-Kvichak		Egegik		Ugashik		Nushagak		Togiak		Total	
Year	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1962	91	9	57	43	87	13	83	17	91	9	84	16
63	88	12	83	17	78	22	82	18	100		86	14
64	88	12	82	18	74	26	87	13	98	2	86	14
65	95	5	84	16	82	18	74	26	100		92	8
66	93	7	88	12	83	17	72	28	98	2	89	11
1967	91	9	90	10	81	19	86	14	95	5	90	10
68	85	15	93	7	81	19	91	9	98	2	90	10
69	91	9	80	20	82	18	83	17	99	1	89	11
70	96	4	84	16	76	24	77	23	99	1	93	7
71	92	8	87	13	89	11	82	18	100		90	10
1972	94	6	90	10	46	54	93	7	100		93	7
73	89	11	89	11	84	16	94	6	99	1	93	7
74	84	16	77	23	53	47	83	17	94	6	84	16
75	93	7	90	10	85	15	83	17	93	7	91	9
76	92	8	90	10	89	11	90	10	93	7	91	9
1977	90	10	88	12	87	13	93	7	93	7	90	10
78	90	10	83	17	94	6	89	11	87	13	89	11
79	90	10	77	23	83	17	84	16	86	14	88	12
80	89	11	71	29	88	12	87	13	86	14	86	14
81	88	12	76	24	89	11	83	17	82	18	85	15
20 Year Total	1,809	191	1,659	341	1,611	389	1,696	304	1,891	109	1,779	221
1962-71 Total	910	90	828	172	813	187	817	183	978	22	889	111
1972-81 Total	899	101	831	169	798	202	879	121	913	87	890	110
20 Year Average	90	10	83	17	81	19	85	15	95	5	89	11
1962-71 Average	91	9	83	17	81	19	82	18	98	2	89	11
1972-81 Average	90	10	83	17	80	20	88	12	91	9	89	11

1/ All salmon species combined.

(Literature Cited: 5)

Appendix Table 18. Sockeye salmon escapement by district, Bristol Bay, 1964-83.

Year	Number of Fish					
	Naknek-Kvichak 1/	Egegik	Ugashik 2/	Nushagak 3/	Togiak 4/	Total
1964	2,555,424	849,576	482,770	1,339,004	114,674	5,341,448
65	25,218,744	1,444,608	997,862	1,099,266	112,786	28,873,266
66	4,965,965	804,246	714,836	1,630,726	122,998	8,238,771
67	4,174,474	636,864	243,930	875,452	91,330	6,022,050
68	3,774,534	338,654	70,896	976,664	56,418	5,217,166
1969	9,907,896	1,015,554	160,380	1,212,586	125,066	12,421,482
70	14,844,868	919,734	735,024	1,966,156	212,896	18,678,678
71	3,510,448	634,014	529,752	1,353,382	213,242	6,240,838
72	1,747,668	546,402	79,428	528,650	81,970	2,984,118
73	618,510	328,842	38,988	581,307	114,930	1,682,577
1974	5,889,750	1,275,630	61,854	2,267,468	108,492	9,603,194
75	15,267,616	1,173,840	429,336	2,273,038	189,162	19,332,992
76	3,367,854	509,160	356,308	1,486,276	200,590	5,920,188
77	2,527,000	692,514	201,520	1,220,056	202,634	4,843,724
78	5,192,066	895,698	82,434	3,485,532	340,076	9,995,806
1979	12,437,996	1,032,042	1,706,904	3,073,571	224,838	18,475,351
80	25,447,866	1,060,860	3,335,284	8,310,438	572,450	38,726,898
81	3,632,788	694,680	1,327,699	2,850,637	365,910	8,871,714
82	2,529,692	1,034,628	1,185,551	2,012,742	341,424	7,104,037
83	4,554,496	792,282	1,001,364	1,948,492	239,610	8,536,244
20 Year Total	152,165,655	16,679,828	13,742,120	40,491,443	4,031,496	227,110,542
1964-73 Total	71,318,531	7,518,494	4,053,866	11,563,193	1,246,310	95,700,394
1974-83 Total	80,847,124	9,161,334	9,688,254	28,928,250	2,785,186	131,410,148
20 Year Average	7,608,283	833,991	687,106	2,024,572	201,575	11,355,527
1964-73 Average	7,131,853	751,849	405,387	1,156,319	124,631	9,570,039
1974-83 Average	8,084,712	916,133	968,825	2,892,825	278,519	13,141,015

1/ Includes Kvichak, Branch and Naknek Rivers.
2/ Includes Mother Goose system 1964-67 and 1976-83.
3/ Includes Wood, Nuyakuk, Snake and Nushagak-Mulchatna Rivers.
4/ Includes Togiak River, Togiak tributaries, Kulukak system and other miscellaneous systems.

(Literature Cited: 1 and 7)

Appendix Table 19. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak district by river system, Bristol Bay, 1964-83.

Year	Number of Fish					
		Escapement				
	Catch	Kvichak 1/	Branch 2/	Naknek 1/	Total	Total Run
1964	2,243,701	957,120	248,700	1,349,604	2,555,424	4,799,125
65	19,139,567	24,325,926	175,020	717,798	25,218,744	44,358,311
66	5,397,538	3,775,184	174,336	1,016,445	4,965,965	10,363,503
67	2,337,226	3,216,208	202,626	755,640	4,174,474	6,511,700
68	1,216,858	2,557,440	193,872	1,023,222	3,774,534	4,991,392
1969	4,655,072	8,394,204	182,490	1,331,202	9,907,896	14,562,968
70	17,803,805	13,935,306	177,060	732,502	14,844,868	32,648,673
71	5,857,378	2,387,392	187,302	935,754	3,510,448	9,367,826
72	1,102,365	1,009,962	151,188	586,518	1,747,668	2,850,033
73	168,249	226,554	35,280	356,676	618,510	786,759
1974	538,163	4,433,844	214,848	1,241,058	5,889,750	6,427,913
75	3,085,416	13,140,450	100,480	2,026,686	15,267,616	18,353,032
76	2,547,276	1,965,282	81,822	1,320,750	3,367,854	5,915,130
77	2,167,214	1,341,144	100,000	1,085,856	2,527,000	4,694,214
78	5,123,668	4,149,288	229,400	813,378	5,192,066	10,315,734
1979	14,991,826	11,218,434	294,200	925,362	12,437,996	27,429,822
80	15,120,457	22,505,268	297,900	2,644,698	25,447,866	40,568,323
81	10,992,809	1,754,358	82,210	1,796,220	3,632,788	14,625,597
82	4,987,922 3/	1,134,840	239,300	1,155,552	2,529,692	7,517,614
83	21,314,327 3/	3,569,982	96,220	888,294	4,554,496	25,868,823
20 Year Total	140,790,837	125,998,186	3,464,254	22,703,215	152,165,655	292,956,492
1964-73 Total	59,921,759	60,785,296	1,727,874	8,805,361	71,318,531	131,240,290
1974-83 Total	80,869,078	65,212,890	1,736,380	13,897,854	80,847,124	161,716,202
20 Year Average	7,039,542	6,299,909	173,213	1,135,161	7,608,283	14,647,825
1964-73 Average	5,992,176	6,078,530	172,787	880,536	7,131,853	13,124,029
1974-83 Average	8,086,908	6,521,289	173,638	1,389,785	8,084,712	16,171,620

1/ Tower count
2/ Tower count 1964-76 and aerial survey estimates 1977-83.
3/ Preliminary

(Literature Cited: 1, 7 and 14)

Appendix Table 20. Inshore sockeye salmon total run by river system, Naknek-Kvichak district, Bristol Bay, 1964-83.

	Number of Fish in Thousands and Percent of Total Run						
	Kvichak		Branch		Naknek		
Year	Number	%	Number	%	Number	%	Total Run 1/
1964	1,721	36	523	11	2,556	53	4,800
65	42,112	95	414	1	1,832	4	44,358
66	7,944	77	311	3	2,109	20	10,364
67	5,017	77	269	4	1,225	19	6,511
68	2,945	59	255	5	1,791	36	4,991
1969	12,155	83	273	2	2,135	15	14,563
70	30,517	94	407	1	1,726	5	32,650
71	6,152	66	509	5	2,706	29	9,367
72	1,352	48	183	6	1,315	46	2,850
73	248	31	37	5	501	64	786
1974	4,582	71	225	4	1,621	25	6,428
75	14,746	80	114	1	3,493	19	18,353
76	3,423	58	137	2	2,354	40	5,914
77	2,081	44	150	3	2,463	53	4,694
78	7,965	77	455	5	1,896	18	10,316
1979	24,637	90	573	2	2,219	8	27,429
80	35,248	87	561	1	4,759	12	40,568
81 2/	6,960	48	319	2	7,302	50	14,581
82 2/	2,635	35	667	9	4,215	56	7,517
83 2/	19,922	77	552	2	5,395	21	25,869
20 Year Total	232,362		6,934		53,613		292,909
1964-73 Total	110,163		3,181		17,896		131,240
1974-83 Total	122,199		3,753		35,717		161,669
20 Year Average	11,618	80	347	2	2,681	18	14,645
1964-73 Average	11,016	84	318	2	1,790	14	13,124
1974-83 Average	12,220	76	375	2	3,572	22	16,167

1/ Due to rounding of river system total runs, the district total run may not equal the actual shown on Appendix Table 19.
2/ Preliminary apportionment.

(Literature Cited: 1 and 7)

Appendix Table 21. Inshore commercial catch and escapement of sockeye salmon in the Egegik and Ugashik district by river system, Bristol Bay, 1964-83.

	Number of Fish							
	Egegik District			Ugashik District				
		Escapement			Escapement			
Year	Catch	Egegik 1/	Total Run	Catch	Ugashik 1/	Mother Goose 2/	Total	Total Run
1964	1,103,935	849,576	1,953,511	576,768	472,770	10,000	482,770	1,059,538
65	3,179,559	1,444,608	4,624,167	925,690	996,612	1,250	997,862	1,923,552
66	2,101,174	804,246	2,905,420	445,458	704,436	10,400	714,836	1,160,294
67	1,070,942	636,864	1,707,806	163,744	238,830	5,100	243,930	407,674
68	671,554	338,654	1,010,208	82,457	70,896		70,896	153,353
1969	889,322	1,015,554	1,904,876	169,845	160,380		160,380	330,225
70	1,403,509	919,734	2,323,243	171,541	735,024		735,024	906,565
71	1,306,682	634,014	1,940,696	954,068	529,752		529,752	1,483,820
72	839,820	546,402	1,386,222	17,440	79,428		79,428	96,868
73	221,337	328,842	550,179	3,920	38,988		38,988	42,908
1974	172,253	1,275,630	1,447,883	2,151	61,854		61,854	64,005
75	964,024	1,173,840	2,137,864	14,558	429,336		429,336	443,894
76	1,329,788	509,160	1,838,948	174,923	341,808	14,500	356,308	531,231
77	1,780,567	692,514	2,473,081	92,623	201,486	34	201,520	294,143
78	1,207,294	895,698	2,102,992	7,995	70,434	12,000	82,434	90,429
1979	2,257,332	1,032,042	3,289,374	391,118	1,700,904	6,000	1,706,904	2,098,022
80	2,623,066	1,060,860	3,683,926	885,875	3,321,384	13,900	3,335,284	4,221,159
81	4,361,406	694,680	5,056,086	2,116,066	1,326,762	937	1,327,699	3,443,765
82	2,413,935 3/	1,034,628	3,448,563	1,161,117 3/	1,157,526	28,025	1,185,551	2,346,668
83	6,740,310 3/	792,282	7,532,592	3,341,978 3/	1,000,614	750	1,001,364	4,343,342
20 Year Total	36,637,809	16,679,828	53,317,637	11,699,335	13,639,224	102,896	13,742,120	25,441,445
1964-73 Total	12,787,834	7,518,494	20,306,328	3,510,931	4,027,116	26,750	4,053,866	7,564,797
1974-83 Total	23,849,975	9,161,334	33,011,309	8,188,404	9,612,108	76,146	9,688,254	17,876,658
20 Year Average	1,831,890	833,991	2,665,882	584,967	681,961	8,575	687,106	1,272,073
1964-73 Average	1,278,783	751,849	2,030,633	351,093	402,712	6,688	405,387	756,480
1974-83 Average	2,384,998	916,133	3,301,131	818,840	961,211	9,518	968,825	1,787,666

1/ Tower count.
2/ Aerial survey estimate.
3/ Preliminary.
4/ Only years and systems with escapement data were included in calculating averages.

(Literature Cited: 1 and 7)

Appendix Table 22. Inshore commercial catch and escapement of sockeye salmon in the Nushagak district by river system, Bristol Bay, 1964-83.

	Number of Fish							
		Escapement						
Year	Catch	Wood 1/	Igushik 1/	Nuyakuk 1/	Nush/Mul 2/	Snake 3/	Total	Total Run
1964	1,420,941	1,076,112	128,532	103,224	18,700	12,436	1,339,004	2,759,945
65	793,323	675,156	180,840	203,070	28,200	12,000	1,099,266	1,892,589
66	1,170,271	1,208,682	206,360	161,010	50,174	4,500	1,630,726	2,800,997
67	657,711	515,772	281,772	20,250	46,658	11,000	875,452	1,533,163
68	749,281	649,344	194,508	96,642	32,070	4,100	976,664	1,725,945
1969	773,207	604,338	512,328	69,828	16,792	9,300	1,212,586	1,985,793
70	1,188,534	1,161,964	370,920	364,648	44,824	23,800	1,966,156	3,154,690
71	1,256,799	851,202	210,960	224,382	58,336	8,500	1,353,382	2,610,181
72	381,347	430,602	60,018	28,596	7,434	2,000	528,650	909,997
73	272,093	330,474	59,508	110,016	80,394	915	581,307	853,400
1974	510,571	1,708,836	358,752	154,614	30,000	15,266	2,267,468	2,778,039
75	645,902	1,270,116	241,086	669,918	82,400	9,518	2,273,038	2,918,940
76	1,265,422	817,008	186,120	425,220	45,200	12,728	1,486,276	2,751,698
77	619,025	561,828	95,970	232,554	320,400	9,304	1,220,056	1,839,081
78	3,137,166	2,267,238	536,154	576,666	87,400	18,074	3,485,532	6,622,698
1979	3,327,346	1,706,352	859,560	360,120	139,100	8,439	3,073,571	6,400,917
80	4,497,787	2,969,040	1,987,530	3,026,568	290,800	36,500	8,310,438	12,808,255
81	7,493,093	1,233,318	591,144	834,204	177,400	14,571	2,850,637	10,343,730
82	5,998,830 4/	976,470	423,768	537,864	63,000	11,640	2,012,742	8,011,572
83	5,296,322 4/	1,360,968	180,438	318,606	85,400	3,080	1,948,492	7,244,814
20 Year Total	41,454,971	22,374,820	7,666,268	8,518,000	1,704,682	227,671	40,491,443	81,946,414
1964-73 Total	8,663,507	7,503,646	2,205,746	1,381,666	383,582	88,551	11,563,193	20,226,700
1974-83 Total	32,791,464	14,871,174	5,460,522	7,136,334	1,321,100	139,120	28,928,250	61,719,714
20 Year Average	2,072,749	1,118,741	383,313	425,000	85,234	11,384	2,024,572	4,097,321
1964-73 Average	866,351	750,365	220,575	138,167	38,358	8,855	1,156,319	2,022,670
1974-83 Average	3,279,146	1,487,117	546,052	713,633	132,110	13,912	2,892,825	6,171,971

1/ Tower Count.
2/ Aerial survey estimates 1964-65 and 1977-83; tower counts 1966-70 and 1973-74. Tower not operated in 1971-72 and 1975-76; escapement estimates for these years were based on the average ratio of Nuyakuk/ Nushagak-Mulchatna River system in those years when data was available.
3/ Tower count 1964; aerial survey estimate 1965-72, 1980 and 1982-83: weir count 1973-79 and 1981.
4/ Preliminary.

(Literature Cited: 1, 7, 13 and 17)

Appendix Table 23. Inshore sockeye salmon total run by river system, Nushagak district, Bristol Bay, 1964-83.

	Number of Fish in Thousands and Percent of Total Run										
	Wood		Igushik		Nuyakuk		Nush-Mul.		Snake		
Year	Number	%	Number	%	Number	%	Number	%	Number	%	Total Run 1/
1964	2,151	78	319	11	215	8	48	2	27	1	2,760
65	1,144	60	314	17	364	19	50	3	20	1	1,892
66	1,963	70	445	16	294	11	91	3	7	+	2,800
67	1,046	68	300	20	53	3	123	8	11	1	1,533
68	1,056	61	439	26	168	10	59	3	4	+	1,726
1969	1,056	53	752	38	129	6	39	2	9	1	1,985
70	1,758	56	671	21	604	19	97	3	24	1	3,154
71	1,438	55	619	24	432	17	113	4	9	+	2,611
72	587	65	157	17	146	16	17	2	3	+	910
73	444	52	96	11	176	21	136	16	1	+	853
1974	2,132	77	421	15	172	6	36	1	19	1	2,780
75	1,493	51	387	13	889	30	133	5	17	1	2,919
76	1,443	52	328	12	856	31	101	4	24	1	2,752
77	825	45	149	8	365	20	486	26	13	1	1,838
78	4,059	61	1,075	16	1,262	19	194	3	33	1	6,623
1979	3,544	55	1,814	28	743	12	282	5	18	+	6,401
80	4,488	35	3,072	24	4,720	37	473	4	55	+	12,808
81 2/	4,365	41	2,423	23	3,138	30	588	6	50	+	10,564
82 2/	3,617	45	1,828	23	2,290	29	235	3	42	+	8,012
83 2/	4,547	63	678	9	1,572	22	436	6	12	+	7,245
20 Year Total	43,156		16,287		18,588		3,737		398		82,166
1964-73 Total	12,643		4,112		2,581		773		115		20,224
1974-83 Total	30,513		12,175		16,007		2,964		283		61,942
20 Year Average	2,158	52	814	20	929	23	187	5	20	+	4,108
1964-73 Average	1,264	62	411	20	258	13	77	4	12	1	2,022
1974-83 Average	3,051	49	1,218	20	1,601	26	296	5	28	+	6,194

1/ Due to rounding of river system total runs, the district total run may not equal the actual shown on Appendix Table 22.
2/ Preliminary apportionment.

(Literature Cited: 1 and 7)

Appendix Table 24. Inshore commercial catch and escapement of sockeye salmon in the Togiak district by river system, Bristol Bay, 1964-83.

	Number of Fish									
	Catch				Escapement					
					Togiak					
Year	Togiak	Kulukak	Os/Mat 1/	Total	Lake 2/	River 3/	Tributaries 4/	Kulukak 5/	Total	Total Run
1964	242,489	8,286		250,775	95,574		9,300	9,800	114,674	365,449
65	213,835	3,265		217,100	88,386		8,100	16,300	112,786	329,886
66	190,479	7,263	2,057	199,799	91,098		13,100	18,800	122,998	332,797
67	71,512	24,379	5,216 6/	101,107	69,330		12,000	10,000	91,330	192,437
68	65,475	2,618	4,606	72,699	42,918		7,000	6,500	56,418	129,117
1969	129,615	3,411	1,226	134,252	109,266		7,400	8,400	125,066	259,318
70	152,748		629	153,377	192,096		10,800	10,000	212,896	366,273
71	200,507	7,927	626	209,060	190,842		9,400	13,000	213,242	422,302
72	51,354	17,244	6,663	75,261	74,070		4,500	3,400	81,970	157,231
73	75,694	15,551	4,478	95,723	95,730		11,200	8,000	114,930	210,653
1974	110,886	13,615	14,840	139,341	82,992	12,000	8,600	4,900	108,492	247,833
75	184,856	3,821	237	188,914	160,962	12,200	7,400	8,600	189,162	378,076
76	293,016	4,822	4,045	301,883	158,190	15,000	16,200	11,200	200,590	502,473
77	201,004	16,252	1,195	218,451	133,734	4,400	24,400	40,100	202,634	421,085
78	422,100	29,668	248 6/	452,016	273,576	15,000	17,600	33,900	340,076	792,092
1979	393,337	66,629	1,018	460,984	171,138	14,200	12,900	26,600	224,838	685,822
80	591,470	42,811	280	634,561	461,850	27,900	37,000	45,700	572,450	1,207,011
81	620,288	19,246	173	639,707	208,080	21,150	77,900	58,780	365,910	1,005,617
82	563,890	19,810	1	583,701 7/	244,824	3,450	40,400	52,750	341,424	925,125
83	531,953	50,300	1,839	584,092 7/	191,520	7,200	13,920	26,970	239,610	823,702
20 Year Total	5,306,508	356,918	49,377	5,712,803	3,136,176		349,120	413,700	4,031,496	9,744,299
1964-73 Total	1,393,708	89,944	25,501	1,509,153	1,049,310		92,800	104,200	1,246,310	2,755,463
1974-83 Total	3,912,800	266,974	23,876	4,203,650	2,086,866	132,500	256,320	309,500	2,785,186	6,988,836
20 Year Average 8/	265,325	17,846	2,743	285,640	156,809		17,456	20,685	201,575	487,215
1964-73 Average	139,371	8,994	3,188	150,915	104,931		9,280	10,420	124,631	275,546
1974-83 Average	391,280	26,697	2,388	420,365	208,687	13,250	25,632	30,950	278,519	698,884

1/ Catches in the Osviak and Matogak sections were combined.
2/ Tower count.
3/ Aerial survey estimate.
4/ Aerial survey estimate includes Gechiak, Pungokepuk, Ongivinuck, Ungalikthluk/Kukayachagak, and other miscellaneous river systems.
5/ Aerial survey estimate includes Kulukak River and Lake and Tithe Creek ponds.
6/ Includes 25 fish from Cape Peirce section in 1967 and 248 in 1978.
7/ Preliminary.
8/ Only years and systems with catch/escapement data were included in calculating averages.

(Literature Cited: 1, 7, 13 and 19)

Appendix Table 25. Inshore total return of sockeye salmon by district, Bristol Bay, 1964-83.

Year	Commercial Catch and Escapement in Numbers of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1964	4,799,125	1,953,511	1,059,538	2,759,945	365,449	10,937,568
65	44,358,311	4,624,167	1,923,552	1,892,589	329,886	53,128,505
66	10,363,503	2,905,420	1,160,294	2,800,997	322,797	17,553,011
67	6,511,700	1,707,806	407,674	1,533,163	192,437	10,352,780
68	4,991,392	1,010,208	153,353	1,725,945	129,117	8,010,015
1969	14,562,968	1,904,876	330,225	1,985,793	259,318	19,043,180
70	32,648,673	2,323,243	906,565	3,154,690	366,273	39,399,444
71	9,367,826	1,940,696	1,483,820	2,610,181	422,302	15,824,825
72	2,850,033	1,386,222	96,868	909,997	157,231	5,400,351
73	786,759	550,179	42,908	853,400	210,653	2,443,899
1974	6,427,913	1,447,883	64,005	2,778,039	247,833	10,965,673
75	18,353,032	2,137,864	443,894	2,918,940	378,076	24,231,806
76	5,915,130	1,838,948	531,231	2,751,698	502,473	11,539,480
77	4,694,214	2,473,081	294,143	1,839,081	421,085	9,721,604
78	10,315,734	2,102,992	90,429	6,622,698	792,092	19,923,945
1979	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
80	40,568,323	3,683,926	4,221,159	12,808,225	1,207,011	62,488,644
81	14,625,597	5,056,086	3,443,765	10,343,730	1,005,617	34,474,795
82 1/	7,517,614	3,448,563	2,346,668	8,011,572	925,125	22,249,542
83 1/	25,868,823	7,532,592	4,343,342	7,244,814	823,702	45,813,273
20 Year Total	292,956,492	53,317,637	25,441,455	81,946,414	9,744,299	463,406,297
1964-73 Total	131,240,290	20,306,328	7,564,797	20,226,700	2,755,463	182,093,578
1974-83 Total	161,716,202	33,011,309	17,876,658	61,719,714	6,988,836	281,312,719
20 Year Average	14,647,825	2,665,882	1,272,073	4,097,321	487,215	23,170,315
1964-73 Average	13,124,029	2,030,633	756,480	2,022,670	275,546	18,209,358
1974-83 Average	16,171,620	3,301,131	1,787,666	6,171,971	698,884	28,131,272

1/ Preliminary catch.

(Literature Cited: 1, 7, 17, and 19)

Appendix Table 26. Inshore sockeye salmon total run, escapement goals and deviation, in the Kvichak and Naknek River systems, Bristol Bay, 1964-83.

	Number of Fish in Thousands							
			Kvichak River			Naknek River		
	Inshore Run		Escapement			Escapement		
Year	Kvichak	Naknek	Goal	Actual	Percent Deviation 1/	Goal	Actual	Percent Deviation 1/
1964	1,721	2,556	5,000	957	- 81	850	1,350	+ 59
65	42,112	1,832	8,000	24,326	+204	800	718	- 10
66	7,944	2,109	6,000	3,775	- 37	800	1,016	+ 27
67	5,017	1,225	3,500	3,216	- 8	1,000	756	- 24
68	2,945	1,791	874	2,557	+193	1,000	1,023	+ 2
1969	12,155	2,135	6,000	8,394	+ 40	1,000	1,331	+ 33
70	30,517	1,726	19,000	13,935	- 27	1,000	733	- 27
71	6,152	2,706	2,500	2,387	- 5	900	936	+ 4
72	1,352	1,315	2,000	1,010	- 50	800	587	- 27
73	248	501	2,000	227	- 89	800	357	- 55
1974	4,582	1,621	6,000	4,434	- 26	800	1,241	+ 55
75	14,746	3,493	14,000	13,140	- 6	800	2,027	+153
76	3,423	2,354	2,000	1,965	- 2	800	1,321	+ 65
77	2,081	2,463	2,000	1,341	- 33	800	1,086	+ 36
78	7,965	1,896	2,000	4,149	+107	800	813	+ 2
1979	24,637	2,219	6,000	11,218	+ 87	800	925	+ 16
80	35,248	4,759	14,000	22,505	+ 61	800	2,665	+233
81 2/	6,960	7,302	2,000	1,754	- 12	800	1,796	+125
82 2/	2,635	4,215	2,000	1,135	- 43	800	1,156	+ 45
83 2/	19,922	5,395	2,000	3,570	+ 79	800	888	+ 11
20 Year Total	232,362	53,613	106,874	125,995	1,190	16,950	22,725	1,009
1964-73 Total	110,163	17,896	54,874	60,784	734	8,950	8,807	268
1974-83 Total	122,199	35,717	52,000	65,211	456	8,000	13,918	741
20 Year Average	11,618	2,681	5,344	6,300	60 3/	848	1,136	50 3/
1964-73 Average	11,016	1,790	5,487	6,078	73	895	881	27
1974-83 Average	12,220	3,572	5,200	6,521	46	800	1,392	74

1/ Percent deviation = deviation from goal divided by goal.
2/ Preliminary catch apportionment.
3/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

Appendix Table 27. Inshore sockeye salmon total run, escapement goals and deviation, in the Egegik and Ugashik River systems, Bristol Bay, 1964-83.

	Number of Fish in Thousands							
			Egegik River			Ugashik River		
	Inshore Run		Escapement			Escapement 2/		
Year	Egegik	Ugashik	Goal	Actual	Percent Deviation 1/	Goal	Actual	Percent Deviation 1/
1964	1,954	1,050	850	850	0	600	473	- 21
65	4,624	1,922	1,000	1,445	+ 45	800	997	+ 25
66	2,905	1,150	1,000	804	- 20	850	704	- 17
67	1,708	403	1,000	637	- 36	850	239	- 72
68	1,010	153	1,000	339	- 66	750	71	- 91
1969	1,905	330	700	1,016	+ 45	400	160	- 60
70	2,323	907	1,000	920	- 8	700	735	+ 5
71	1,941	1,484	600	634	+ 6	500	530	+ 6
72	1,386	97	600	546	- 9	450	79	- 82
73	550	43	500	329	- 34	188	39	- 79
1974	1,448	64	600	1,276	+113	500	62	- 88
75	2,138	444	600	1,174	+ 96	500	429	- 14
76	1,839	517	600	509	- 15	500	342	- 32
77	2,473	294	600	693	+ 16	500	201	- 60
78	2,103	78	600	896	+ 49	500	70	- 86
1979	3,289	2,092	600	1,032	+ 72	500	1,701	+240
80	3,684	4,207	600	1,061	+ 77	500	3,321	+564
81 3/	5,175	3,276	600	695	+ 16	500	1,327	+165
82 3/	3,449	2,319	600	1,035	+ 73	500	1,158	+132
83 3/	7,533	4,343	600	792	+ 32	500	1,001	+100
20 Year Total	53,417	25,173	14,250	16,683	828	11,088	13,639	1,939
1964-73 Total	20,306	7,539	8,250	7,520	269	6,088	4,027	458
1974-83 Total	33,111	17,634	6,000	9,163	559	5,000	9,612	1,481
20 Year Average	2,671	1,259	713	834	41 4/	554	682	97 4/
1964-73 Average	2,031	754	825	752	27	609	403	46
1974-83 Average	3,311	1,763	600	916	56	500	961	148

1/ Percent deviation = deviation from goal divided by goal.
2/ Does not include Mother Goose River system.
3/ Preliminary catch apportionment.
4/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

Appendix Table 28. Inshore sockeye salmon total run, escapement goals and deviation, in the Wood and Igushik River systems, Bristol Bay, 1964-83.

	Number of Fish in Thousands							
			Wood River			Igushik River		
	Inshore Run		Escapement			Escapement		
Year	Wood	Igushik	Goal	Actual	Percent Deviation 1/	Goal	Actual	Percent Deviation 1/
1964	2,151	319	900	1,076	+ 20	250	129	- 48
65	1,144	314	500	675	+ 35	250	181	- 28
66	1,963	445	900	1,209	+ 34	200	206	+ 3
67	1,046	300	1,100	516	- 53	153	282	+ 84
68	1,056	439	1,000	649	- 35	150	195	+ 30
1969	1,056	752	750	604	- 19	200	512	+156
70	1,758	671	1,000	1,162	+ 16	200	371	+ 86
71	1,438	619	750	851	+ 13	150	211	+ 41
72	587	157	750	431	- 43	150	60	- 60
73	444	96	700	330	- 53	150	60	- 60
1974	2,132	421	800	1,709	+114	150	359	+139
75	1,493	387	800	1,270	+ 59	150	241	+ 61
76	1,443	328	800	817	+ 2	150	186	+ 24
77	825	149	800	562	- 30	150	96	- 36
78	4,059	1,075	800	2,267	+183	150	536	+257
1979	3,544	1,814	800	1,706	+113	150	860	+473
80	4,488	3,072	800	2,969	+271	150	1,988	+1,225
81 2/	4,365	2,423	800	1,233	+ 54	150	591	+294
82 2/	3,617	1,828	800	976	+ 22	150	424	+183
83 2/	4,547	678	1,000	1,361	+ 36	200	180	- 10
20 Year Total	43,156	16,287	16,550	22,373	1,205	3,403	7,668	3,298
1964-73 Total	12,643	4,112	8,350	7,503	321	1,853	2,207	596
1974-83 Total	30,513	12,175	8,200	14,870	884	1,550	5,461	2,702
20 Year Average	2,158	814	828	1,119	60 3/	170	383	165 3/
1964-73 Average	1,264	411	835	750	32	185	221	60
1974-83 Average	3,051	1,218	820	1,487	88	155	546	270

1/ Percent deviation = deviation from goal divided by goal.
2/ Preliminary catch apportionment.
3/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

Appendix Table 29. Inshore sockeye salmon total run, escapement goals and deviation, in the Nuyakuk and Togiak River systems, Bristol Bay, 1964-83.

	Number of Fish in Thousands							
			Nuyakuk River			Togiak River		
	Inshore Run		Escapement			Escapement 2/		
Year	Nuyakuk	Togiak	Goal	Actual	Percent Deviation 1/	Goal	Actual	Percent Deviation 1/
1964	215	338	100	103	+ 3	100	96	- 4
65	364	302	200	203	+ 2	150	88	- 41
66	294	282	150	161	+ 7	120	91	- 24
67	53	141	80	20	- 75	90	69	- 23
68	168	108	200	97	- 52	110	43	- 61
1969	129	239	150	70	- 53	100	109	+ 9
70	604	345	214	365	+ 71	100	192	+ 92
71	432	391	132	224	+ 70	115	191	+ 66
72	146	125	71	29	- 59	70	74	+ 6
73	176	171	150	110	- 27	80	96	+ 20
1974	172	194	250	155	- 38	100	83	- 17
75	889	346	250	670	+168	100	161	+ 61
76	856	451	250	425	+ 70	100	158	+ 58
77	365	335	250	233	- 7	100	134	+ 34
78	1,262	696	250	577	+131	100	274	+174
1979	743	564	250	360	+ 44	100	171	+ 71
80	4,720	1,053	250	3,027	+1,111	100	462	+362
81 3/	3,138	828	250	834	+234	100	208	+108
82 3/	2,290	809	250	538	+115	100	245	+145
83 3/	1,572	723	300	319	+ 6	100	192	+ 92
20 Year Total	18,588	8,441	3,997	8,520	2,343	2,035	3,137	1,468
1964-73 Total	2,581	2,442	1,447	1,382	419	1,035	1,049	346
1974-83 Total	16,007	5,999	2,550	7,138	1,924	1,000	2,088	1,122
20 Year Average	929	422	200	426	117 4/	102	157	74 4/
1964-73 Average	258	244	145	138	42	104	105	35
1974-83 Average	1,601	600	255	714	192	100	209	112

1/ Percent deviation = deviation from goal divided by goal.
2/ Does not include Togiak River and tributaries.
3/ Preliminary catch apportionment.
4/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

Appendix Table 30. Kvichak River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	9,433	14	23,509	12,755	1,316		37,594	3.98
57	2,843	7	226	3,437	262	2	3,934	1.38
58	535		70	179	27	20	296	0.55
59	680		194	318	13		525	0.77
60	14,630		1,397	46,236	6,279	6	54,008	3.69
1961	3,706	1	317	2,415	666		3,399	0.92
62	2,581		96	4,473	406	7	5,252	2.04
63	339		49	676	354	19	1,098	3.24
64	957	8	2,083	2,662	681	11	5,445	5.69
65	24,326	23	9,787	32,066	1,345	2	43,223	1.78
1966	3,775	15	481	5,255	346	1	6,098	1.62
67	3,216		329	1,007	77		1,413	0.44
68	2,557		271	131	156	2	560	0.22
69	8,394		141	4,460	593	10	5,204	0.62
70	13,935	1	83	14,337	1,222	11	15,654	1.12
1971	2,387		260	2,192	284		2,736	1.15
72	1,010		248	1,351	302		1,901	1.88
73	227		587	1,244	568		2,399	10.59
74	4,434	10	6,539	18,365	769	5	25,688	5.79
75	13,140	5	5,822	29,461	565		35,853	2.73
1976	1,965	5	5,107	4,627	253		9,992	5.08
77	1,341	47	1,840	1,041	91		(3,019)	(2,25)
78	4,149		1,729	2,343			(4,072)	(0.98)
79	11,218	58	17,560				(17,618)	(1.57)
80	22,505	2					(2)	(0.00)
1981	1,754							
82	1,135							
83	3,570							
Total	160,742	196	78,725	191,391	16,575	96	286,983	
1956-76 Total	111,070	89	57,596	188,007	16,484	96	262,272	
Average 3/	5,580	4	2,743	8,953	785	5	12,489	2.28
Percent		+	22.0	71.7	6.3	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 31. Branch River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	784	5	1,825	435	64		2,329	2.97
57	127		5	65	13	1	84	0.66
58	95		39	53	52		144	1.52
59	825		275	387	95	6	763	0.92
60	1,241		101	313	30		444	0.36
1961	90	10	86	187			283	3.14
62	91	19	117	90	19		245	2.69
63	203		189	163	2		354	1.74
64	249	5	91	199	17	1	313	1.26
65	175	6	98	162	19		285	1.63
1966	174	13	264	243	10		530	3.04
67	203	9	278	8	7		381	1.88
68	194	8	117	33	3		161	0.84
69	182		5	155	24		184	1.01
70	177		73	75	2		150	0.84
1971	187	2	26	57	36	2	123	0.66
72	151	1	87	24	13		125	0.83
73	35		96	141	2		239	6.83
74	215	4	292	143	26		465	2.16
75	100	15	403	302	32		752	7.52
1976	82	26	203	167	49		445	5.42
77	100	24	126	639	12		(801)	(8.01)
78	229		92	102			(194)	(0.85)
79	294	3	441				(444)	(1.51)
80	298							
1981	82							
82	239							
83	96							
Total	6,918	150	5,329	4,222	527	10	10,238	
1956-76 Total	5,580	123	4,670	3,481	515	10	8,799	
Average 3/	266	6	222	166	25	+	419	1.58
Percent		1.4	53.1	39.6	5.9	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1, 14, and 19)

Appendix Table 32. Naknek River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	1,773	1	458	1,615	324	2	2,400	1.35
57	635		51	821	680	3	1,555	2.45
58	278		106	735	176	13	1,030	3.71
59	2,232		325	1,077	854		2,256	1.01
60	828	1	1,366	1,294	1,237	3	3,901	4.71
1961	351		231	1,033	624	11	1,899	5.41
62	723		72	564	399	1	1,036	1.43
63	905		137	1,180	610	1	1,928	2.13
64	1,350	1	421	1,350	202	4	1,978	1.47
65	718	5	554	1,043	475	3	2,080	2.90
1966	1,016	5	683	2,205	565	1	3,459	3.40
67	756		309	918	317	1	1,545	2.04
68	1,023	3	141	288	314	2	748	0.73
69	1,331		52	1,251	1,174	3	2,480	1.86
70	733		172	2,134	371		2,677	3.65
1971	936	1	418	1,930	1,800	16	4,165	4.45
72	587	3	242	391	577	1	1,214	2.07
73	357		448	1,102	592		2,142	6.00
74	1,241	2	231	1,230	753	5	2,221	1.79
75	2,027	1	424	3,077	1,543	8	5,053	2.49
1976	1,321	4	1,026	5,378	1,354	27	7,789	5.90
77	1,086	10	599	2,148	429		(3,186)	(2.93)
78	813	1	289	2,675			(2,965)	(3.65)
79	925	4	2,329				(2,333)	(2.52)
80	2,645	1					(1)	(0.00)
1981	1,796							
82	1,156							
83	888							
Total	30,430	43	11,084	35,439	15,370	105	62,041	
1956-76 Total	21,121	27	7,867	30,616	14,941	105	53,556	
Average 3/	1,006	1	375	1,458	711	5	2,550	2.54
Percent		+	14.7	57.2	27.9	0.2	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 33. Egegik River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	1,104	6	1,961	3,902	700	32	6,601	5.98
57	391		35	1,092	1,005	64	2,196	5.61
58	246		41	866	334	19	1,260	5.11
59	1,072		68	1,176	653	69	1,966	1.83
60	1,799	7	452	4,676	2,528	51	7,714	4.29
1961	702		81	657	806	14	1,558	2.22
62	1,027		20	1,001	399	56	1,476	1.44
63	998		17	635	595	13	1,260	1.26
64	850	1	117	1,490	382	52	2,042	2.40
65	1,445		133	2,003	941	46	3,123	2.16
1966	804		235	1,269	825	23	2,352	2.92
67	637		59	854	592	17	1,522	2.39
68	339		38	161	303	13	515	1.52
69	1,016		13	1,185	1,378	112	2,688	2.65
70	920		59	874	262	37	1,232	1.34
1971	634		46	1,537	1,017	53	2,653	4.18
72	546		60	1,579	1,241	18	2,898	5.31
73	329		74	697	878	4	1,653	5.02
74	1,276		147	2,277	533	3	2,960	2.32
75	1,174		153	2,520	791	3	3,467	2.95
1976	509	2	644	3,662	757		5,065	9.95
77	693	2	795	2,384	666		(3,847)	(5.55)
78	896		371	6,218			(6,589)	(7.35)
79	1,032	3	692				(695)	(0.67)
80	1,061	1					(1)	(0.00)
1981	695							
82	1,035							
83	792							
Total	24,022	22	6,311	42,715	17,586	699	67,333	
1956-76 Total	17,818	16	4,453	34,113	16,920	699	56,2011	
Average 3/	848	1	212	1,624	806	33	2,676	3.15
Percent		+	7.9	60.7	30.1	1.2	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 34. Ugashik River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	425	13	3,066	869	37		3,985	9.38
57	215		34	446	106	2	588	2.73
58	280		58	537	67		662	2.36
59	219		16	340	160	1	517	2.36
60	2,341		660	1,820	471	1	2,952	1.26
1961	366		233	728	117		1,078	2.95
62	274		73	306	26		405	1.48
63	397		13	109	22		144	0.36
64	483		37	255	19	9	320	0.66
65	998		82	275	179		536	0.54
1966	715	1	678	1,396	19		2,094	2.93
67	244		52	85	33		170	0.70
68	71		13	26	4		43	0.61
69	160		4	57	27	2	90	0.56
70	735		5	256	29	1	291	0.40
1971	530		176	497	123	1	797	1.50
72	79		33	176	35	4	248	3.14
73	39		18	21	50		89	2.28
74	62		19	603	84		706	11.39
75	429	3	1,442	2,184	302	1	3,932	9.17
1976	356		2,005	2,507	398	3	4,913	13.80
77	202	2	542	1,709	188		(2,441)	(12.08)
78	82		238	1,213			(1,451)	(17.70)
79	1,707	19	2,963				(2,982)	(1.75)
80	3,335	1					(1)	(0.00)
1981	1,328							
82	1,186							
83	1,001							
Total	18,259	39	12,460	16,415	2,496	25	31,435	
1956-76 Total	9,418	17	8,717	13,493	2,308	25	24,560	
Average 3/	448	1	415	643	110	1	1,170	2.61
Percent		0.1	35.5	54.9	9.4	0.1	100.0	

1/ Includes aerial estimates of King Salmon River escapements 1960-67, and 1976-83. Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 35. Wood River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	773		752	616			1,368	1.77
57	289		147	296			443	1.53
58	960	1	1,957	467	33		2,458	2.56
59	2,209		903	752	68	4	1,727	0.78
60	1,016	6	1,416	1,111	99		2,632	2.59
1961	461		251	1,124	29	2	1,406	3.05
62	874	2	886	506	43		1,437	1.64
63	721		574	722	44		1,340	1.86
64	1,076	1	382	696	72	7	1,158	1.08
65	675	3	487	997	199	4	1,690	2.50
1966	1,209	7	926	799	55		1,787	1.48
67	516	3	577	214	68		862	1.67
68	649	1	419	397	26		843	1.30
69	604		61	642	105	1	809	1.34
70	1,162	2	1,534	1,082	30		2,648	2.28
1971	851	2	442	757	63		1,264	1.49
72	431	3	771	602	39		1,415	3.28
73	330	2	211	1,130	33		1,376	4.17
74	1,709	7	2,902	2,022	60		4,991	2.92
75	1,270	55	1,543	2,275	674		4,547	3.58
1976	817	3	2,145	2,868	271		5,287	6.47
77	562	19	948	2,234	14		3,215	5.72
78	2,267		1,176	1,762			(2,938)	(1.30)
79	1,706	8	2,811				(2,819)	(1.65)
80	2,969	3					(3)	(0.00)
1981	1,233							
82	976							
83	1,361							
Total	29,676	128	24,221	24,071	2,025	18	50,463	
1956-76 Total	18,602	98	19,286	20,075	2,011	18	41,488	
Average 3/	886	5	918	956	96	1	1,976	2.23
Percent		0.2	46.5	48.4	4.8	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 36. Igushik River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year					Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	400		163	506	40		709	1.77
57	130		2	54	20		76	0.58
58	107		13	91	28		132	1.23
59	644		92	246	27		365	0.57
60	495		62	341	61		464	0.94
1961	294		32	404	7		443	1.51
62	16		32	144	14		190	11.88
63	92		168	290	23		481	5.23
64	129		174	586	54		814	6.31
65	181		313	647	123		1,083	5.98
1966	206		79	484	11	2	576	2.80
67	282		78	95	14		187	0.66
68	195		82	97	13		192	0.98
69	512		1	399	114		514	1.00
70	371		25	259	50		334	0.90
1971	211		55	220	27		302	1.43
72	60		89	114	19		222	3.70
73	60		19	621	24		664	11.07
74	359		454	1,057	23		1,534	4.27
75	241		759	2,580	508		3,847	15.96
1976	186		521	1,677	214		2,412	12.97
77	96		318	1,596	10		(1,924)	(20.04)
78	536		54	354			(408)	(0.76)
79	860		323				(323)	(0.38)
80	1,988							
1981	591							
82	424							
83	180							
Total	9,846		3,908	12,862	1,424	2	18,196	
1956-76 Total	5,171		3,213	10,912	1,414	2	15,541	
Average 3/	246		153	520	67	+	740	3.01
Percent			20.7	70.2	9.1	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 37. Nuyakuk River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year						Return Per Spawner 2/
		3	4	5	6	7	Total	
1956	30		210	153			363	12.10
57	67		4	13	1		18	0.27
58	196		85	343	12		440	2.24
59	49		54	61	11		126	2.57
60	146	4	148	387	11		550	3.77
1961	80	1	67	297	1		366	4.58
62	38		20	43	2		65	1.71
63	167		13	167	6		186	1.11
64	103	1	15	67	2		85	0.83
65	203		87	596	54		737	3.63
1966	161	1	115	409	17		542	3.37
67	20	1	9	132	6		148	7.40
68	97		30	176	8		214	2.21
69	70	3	20	85	8		116	1.66
70	365		89	872	103		1,064	2.92
1971	224	1	105	794	43	1	944	4.21
72	29		59	304	144		507	17.48
73	110		44	1,014	1		1,059	9.63
74	155		117	244			361	2.33
75	670	10	505	4,432	225	1	5,173	7.72
1976	425	1	382	2,724	269		3,376	7.94
77	233		304	1,959	53		(2,316)	(9.94)
78	577		107	1,077			(1,184)	(2.05)
79	360	1	377				(378)	(1.05)
80	3,027	1					(1)	(0.00)
1981	834							
82	538							
83	319							
Total	9,293	25	2,966	16,349	977	2	20,319	
1956-76 Total	3,405	23	2,178	13,313	924	2	16,440	
Average 3/	162	1	104	634	44	+	783	4.83
Percent		0.1	13.2	81.0	5.6	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1 and 19)

Appendix Table 38. Nushagak-Mulchatna River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year 3	4	5	6	7	Total	Return Per Spawner 2/
1956	5		49	3			52	10.40
57	10		99	12			111	11.10
58	5		16				16	3.20
59		1	62		1		64	
60		5	41	54	3		103	
1961	20	8	9	92	2		111	5.55
62	9		6	98	1		105	11.67
63	46		29	46	2		77	1.67
64	19	1	20	15			36	1.89
65	28	1	43	85	4		133	4.75
1966	50	3	40	88	3		134	2.68
67	47	1	29	12	7		49	1.04
68	32	1	7	75	9		92	2.88
69	17		66	9	7		82	4.82
70	45	1	23	98	7		129	2.87
1971	58	2	41	78	114		235	4.05
72	7		28	309	38		375	53.57
73	80		95	147	38		280	3.50
74	30	2	13	188	40		243	8.10
75	82		61	394	55		510	6.22
1976	45	3	49	499	36		587	13.04
77	320		55	191	90		(336)	(1.05)
78	87		13	245			(258)	(2.97)
79	139		110				(110)	(0.79)
80	291							
1981	177							
82	63							
83	85							
Total	1,797	29	1,004	2,738	457		4,228	
1956-76 Total 3/	635	23	723	2,248	363		3,357	
Average 4/	33	1	38	118	19		177	5.29
Percent		0.7	21.5	67.0	10.8		100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Includes 1956-58 and 1961-76.
4/ Averages and percentages computed from 1956-58 and 1961-76.

(Literature Cited: 1, 13 and 19)

Appendix Table 39. Snake River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement	Return by Year					Return Per Spawner 2/
		3	4	5	6	7 Total	
1956	4		12	66		18	4.50
57	3		2	1		3	1.00
58	9		4	3		7	0.78
59	140		62	14	1	77	0.55
60	17		14	19		33	1.94
1961	5		5	4		9	1.80
62	2		3	5		8	4.00
63	38		7	3		10	0.26
64	12		2	6	1	9	0.75
65	12		4	12	1	17	1.42
1966	5		14	4		18	3.60
67	11		4	1		5	0.45
68	4		2	1	1	4	1.00
69	9		1	9	2	12	1.33
70	24		10	11		21	0.88
1971	9		5	19	5	29	3.22
72	2		6	2		8	4.00
73	1		8	7		15	15.00
74	15		26	7	5	38	2.53
75	10		10	24	12	46	4.60
1976	13		26	25	4	55	4.23
77	9		14	22	1	(37)	(4.11)
78	18		17	7		(24)	(1.33)
79	8		4			(4)	(0.50)
80	37						
1981	15						
82	12						
83	3						
Total	447		262	212	33	507	
1956-76 Total	345		227	183	32	442	
Average 3/	16		11	9	2	21	1.28
Percent			51.4	42.4	7.2	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Returns in parenthesis are incomplete.
3/ Averages and percentages computed from 1956-76.

(Literature Cited: 1, 13, and 19)

Appendix Table 40. Togiak River sockeye salmon escapement and return by brood year, Bristol Bay, 1956-83. 1/

Brood Year	Escapement 2/	Return by Year						Return Per Spawner 3/
		3	4	5	6	7	Total	
1956	225		107	311	15	1	434	1.93
57	25	2	50	91	37		180	7.20
58	72	4	65	174	25		268	3.72
59	210		129	147	8		284	1.35
60	192		186	292	50		528	2.75
1961	122	1	84	226	19		330	2.70
62	62		50	102	8	1	161	2.60
63	116		42	79	23	4	148	1.28
64	105		40	115	17		172	1.64
65	96		149	201	40		390	4.06
1966	104	1	194	375	10	1	581	5.59
67	81	1	22	100	37		160	1.98
68	50		47	151	17		215	4.30
69	117		33	159	15		207	1.77
70	203		55	260	66	1	382	1.88
1971	200		107	353	66	2	528	2.64
72	79	1	87	165	98		351	4.44
73	107	1	146	391	16		554	5.18
74	104	1	248	358	47	1	655	6.30
75	181		270	873	51		1,194	6.60
1976	189		173	587	145		905	4.79
77	163		210	569	15		(794)	(4.87)
78	306		129	517			(646)	(2.11)
79	198	2	271				(273)	(1.38)
80	527							
1981	307							
82	270							
83	205							
Total	4,616	14	2,894	6,596	825	11	10,340	
1956-76 Total	2,640	12	2,284	5,510	810	11	8,627	
Average 3/	126	1	109	262	39	1	411	3.27
Percent		0.1	26.5	63.9	9.4	0.1	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to the nearest thousand fish.
2/ Includes Togiak Lake, Togiak River and tributary spawners.
3/ Returns in parenthesis are incomplete.
4/ Averages and percentages computed from 1956-76.

(Literature Cited: 1, 13 and 19)

Appendix Table 41. Inshore commercial catch and escapement of king salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-83. 1/

	Number of Fish					
	Nushagak District			Togiak District		
Year	Catch	Escapement 2/	Total Run	Catch	Escapement 3/	Total Run
1966	58,184	40,000 a/	98,184	9,967		
67	96,240	65,000 b/	161,240	13,381	10,000	23,381
68	78,201	70,000	148,201	13,499	16,000	29,499
69	80,803	35,000	115,803	20,181	8,000	28,181
70	87,547	50,000	138,547	28,664	15,000	43,664
1971	82,769	40,000 4/	122,769	27,026	20,000	47,026
72	46,045	25,000	71,045	19,976	14,000	33,976
73	30,470	35,000	65,470	10,856	11,000	21,856
74	32,053	70,000	102,053	10,798	15,000	25,798
75	21,454	70,000	91,454	7,226	11,000	18,226
1976	60,684	100,000	160,684	29,744	14,000	43,744
77	85,074	65,000	150,074	35,218	20,000	55,218
78	118,548	130,000	248,548	57,000	40,000	97,000
79	157,321	95,000	252,321	30,022	20,000	50,022
80	64,958	141,000	205,958	12,543	12,000	24,543
1981	193,461	150,000	343,461	23,911	27,000	50,911
82	200,057 5	147,000	347,057	39,997 5/	17,000	56,997
83	139,400 5	162,000	301,400	38,360 5/	22,000	60,360
18 Year Total	1,633,269	1,490,000	3,123,269	428,369	292,000	710,402
1966-75 Total	613,766	500,000	1,113,766	161,574	120,000	271,607
1976-83 Total	1,019,503	990,000	2,009,503	266,795	172,000	438,795
18 Year Average	81,663	82,778	173,515	23,798	17,176	41,788
1966-75 Average	61,377	50,000	111,377	16,157	13,333	30,179
1976-83 Average	127,438	123,750	251,188	33,349	21,500	54,849

1/ Escapement estimates are based on data collected on comprehensive aerial surveys of the spawning grounds; these escapement estimates supercede previously reported escapements, and are rounded to the nearest thousand fish.

2/ Comprehensive aerial coverage was begun in 1968; escapements prior to 1968 were derived from:
   a/ tower enumeration data from Nushagak River, and estimate of total escapement accounted for by tower enumeration;
   b/ tower enumeration data, minimal aerial survey coverage, and general run strength indicators (commercial and subsistence catches).

3/ Comprehensive aerial survey coverage was begun in 1967.

4/ Aerial escapement precluded by adverse weather; however, the escapement was estimated from average mean exploitation rates from 1966-70 and 1972-76.

5/ Preliminary.

(Literature Cited: 1, 5 and 13)

Appendix Table 42. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-83. 1/

	Number of Fish					
	Nushagak District			Togiak District		
Year	Catch	Escapement 2/	Total Run	Catch	Escapement 3/	Total Run
1966	129,344	80,000	209,344	95,410		
67	338,286	200,000	538,286	63,322	179,000	242,322
68	178,786	100,000	278,786	108,001	348,000	456,001
69	214,235	130,000	344,235	66,389	85,000	151,389
70	435,033	273,000	708,033	100,711	241,000	341,711
1971	360,015	226,000	586,015	123,847	229,000	352,847
72	310,126	195,000	505,126	178,885	170,000	348,885
73	336,331	200,000	536,331	195,431	163,000	358,431
74	157,941	100,000	257,941	80,710	161,000	241,710
75	152,891	80,000	232,981	87,058	114,000	201,058
1976	801,064	500,000	1,301,064	153,559	392,000	545,559
77	899,701	609,000	1,508,701	270,649	496,000	766,649
78	651,743	293,000	944,743	274,967	396,000	670,967
79	440,279	166,000	606,279	219,942	293,000	512,942
80	681,930	969,000	1,650,930	299,682	415,000	714,682
1981	795,143	177,000	972,143	229,886	331,000	560,886
82	456,441 4/	256,000	712,441	159,136 4/	86,000	245,136
83	586,166 4/	164,000	750,166	322,670 4/	165,000	487,670
18 Year Total	7,925,455	4,718,000	12,643,455	3,030,255	4,264,000	7,198,845
1966-75 Total	2,612,988	1,584,000	4,196,988	1,099,764	1,690,000	2,694,354
1976-83 Total	5,312,467	3,134,000	8,446,467	1,930,491	2,574,000	4,504,491
18 Year Average	440,303	262,111	702,414	168,348	250,824	423,461
1966-75 Average	261,299	158,400	419,699	109,976	187,778	299,373
1976-83 Average	664,058	391,750	1,055,808	241,311	321,750	563,061

1/ Escapements estimates are based on data collected on comprehensive aerial surveys of the spawning grounds; these estimates supercede previously reported escapements, and are rounded to the nearest thousand fish.

2/ Comprehensive aerial coverage was begun in 1977; escapements were derived from:
(a) 1966 - tower enumeration data from Nushagak River; and estimate of total escaement accounted for by tower enumeration;
(b) 1967 - tower enumeration data, and proportion of escapement to catch in 1966 and 1968;
(c) 1968 and 1973-74 - tower enumeration and aerial survey data;
(d) 1970-72 - average catch/escapement ratio for 1968-69 and 1973-81;
(e) 1975-78 - aerial survey data; and
(f) 1979-83 - adjusted sonar estimate from Portage Creek site.

3/ Comprehensive aerial survey coverage was begun in 1967.

4/ Preliminary.

(Literature Cited: 1, 5 and 13)

Appendix Table 43. Inshore commercial catch and escapement of pink salmon in the Nushagak district by river system, Bristol Bay, 1958-82. 1/

Year	Catch	Number of Fish						Total Run
		Escapement						
		Wood 2/	Igushik 3/	Nuyakuk 4/	Nush/Mul 5/	Snake 5/	Total	
1958	1,113,794			4,000,000			4,000,000	5,113,794
60	289,781			146,359			146,359	436,140
62	880,424	25,000	12,000	493,914	6,100	6,000	543,014	1,423,438
64	1,497,817	1,560	450	883,500	25,000	50	910,560	2,408,377
66	2,337,066			1,442,424			1,442,424	3,779,490
68	1,705,150			2,161,116			2,161,116	3,866,266
1970	417,834			152,580			152,580	570,414
72	67,953			58,536			58,536	126,489
74	413,613	44,800	7,500	529,216	3,100	900	585,516	999,129
76	739,580	21,986	5,070	794,478	41,800	100	863,434	1,603,024
78	4,348,336	205,000	16,210	8,390,184	771,600	3,483	9,386,477	13,734,813
1980	2,202,545	31,150	3,500	2,626,746	123,000	800	2,785,196	4,987,741
82	1,285,947 8/	36,100	8,430	1,592,096	19,130	900	1,656,656	2,942,603
13 Year Total	17,299,850	365,596	53,160	23,271,149	989,730	12,233	24,691,868	41,991,718
13 Year Average 7/	1,330,758	52,228	7,594	1,790,088	141,390	1,748	1,899,374	3,230,132

1/ Includes even-years only.
2/ Aerial survey estimate 1962 and 1974-82; tower count 1964.
3/ Aerial survey estimate 1962-80; aerial survey estimate and tower count 1976 and 1982.
4/ Tower count 1960-82; aerial survey estimate 1958, and below counting tower 1962-64 and 1974-82.
5/ Aerial survey estimate.
6/ Aerial survey estimate 1962-64, 1974-76 and 1980-82, and weir count 1978.
7/ Only years and systems with escapement data were included in calculating averages.
8/ Preliminary.

(Literature Cited: 1, 5, 13 and 21)

Appendix Table 44. Nushagak district pink salmon escapement and return by brood year, Bristol Bay 1958-82. 1/

Brood Year	Number of Fish		Return Per Spawner
	Escapement	Return	
1958	4,000	436	0.11
1960	146	1,423	9.75
62	543	2,408	4.43
64	911	3,779	4.15
66	1,442	3,866	2.68
68	2,161	570	0.26
1970	153	126	0.82
72	59	999	16.93
74	586	1,603	2.74
76	863	13,735	15.92
78	9,386	4,988	0.53
1980	2,785	2,943	1.06
82	1,657		
Total	24,692	36,876	
1958-80 Total	23,035	36,876	
Average 2/	1,920	3,073	1.60

1/ Includes even-years only. All escapements and returns are rounded to the nearest thousand fish.
2/ Averages and percentages computed from 1958-80.

(Literature Cited: 1, 5, 13 and 21)

Appendix Table 45. Average round weight of the commercial salmon catch by district and species, Bristol Bay, 1964-83.

Species and Year	Average Round Weight 1/					Average Bristol Bay 2/
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
SOCKEYE SALMON						
1964						5.2
65						4.5
66						6.1
67						6.3
68				6.4		5.6
1969	5.1	5.5		5.5	5.5	5.3
70	4.8	4.8		5.7	5.8	4.9
71	5.6	5.9		6.2	7.0	6.0
72	6.1	6.0	6.1	6.0	6.4	6.0
73	6.7	7.1	7.3	7.1	7.9	7.1
1974	5.5	5.7	5.2	5.7	7.0	5.8
75	5.2	5.7	5.2	6.1	6.7	5.5
76	5.8	5.9	6.2	6.6	7.5	6.1
77	6.6	6.3	6.8	7.5	7.9	6.7
78	5.5	6.3	6.2	6.3	7.3	5.9
1979	5.8	6.0	6.0	6.1	7.2	5.9
80	5.4	5.6	5.5	6.1	6.8	5.6
81	6.1	6.0	6.3	6.4	6.8	6.2
82	6.2	6.4	6.5	6.4	7.4	6.4
83	5.5	5.8	5.7	5.9	6.7	5.7
KING SALMON						
1964						13.7
65						14.6
66						19.5
67						21.0
68				21.6		17.7
1969	18.0			19.2	23.0	19.7
70	21.5	19.6		18.3	17.0	18.4
71	27.0	21.7		21.7	22.3	22.1
72	25.5	21.6	17.3	19.8	21.1	20.3
73	23.5	21.4	21.0	22.6	24.1	23.0
1974	20.8	18.6	20.7	23.2	21.0	22.4
75	25.0	19.5	18.1	18.8	14.0	17.8
76	27.6	18.6	13.5	18.7	12.1	17.0
77	30.5	22.1	23.8	23.4	20.8	22.9
78	28.3	23.6	29.2	22.3	26.1	23.9
1979	21.8	21.2	22.7	21.1	22.2	21.3
80	20.5	21.0	21.9	19.6	18.0	19.7
81	20.8	18.6	18.9	19.6	13.1	19.0
82	19.4	18.5	20.1	20.4	15.4	19.6
83	20.8	20.2	21.5	21.0	20.7	20.9

(continued)

Appendix Table 45. (continued)

Species and Year	Average Round Weight 1/ Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Average Bristol Bay 2/
CHUM SALMON						
1964						7.1
65						7.0
66						7.5
67						6.8
68						6.3
1969		6.1	5.4	6.0	5.7	5.9
70	5.8	6.5		5.9	6.3	5.9
71	6.5			6.4	6.7	6.5
72	6.5	6.4	5.7	6.5	6.6	6.5
73	7.3	6.9	7.7	7.0	7.3	7.1
1974	6.4	6.4	7.2	6.2	7.4	6.6
75	6.3	6.2	6.1	6.1	6.6	6.3
76	5.9	5.8		6.9	7.1	6.8
77	7.3	6.5	6.7	7.3	8.2	7.4
78	6.6	6.7	6.2	7.1	8.1	7.2
1979	6.8	7.2	7.5	6.2	7.8	6.8
80	6.2	6.6	6.3	5.9	6.7	6.2
81	6.5	6.8	7.2	6.6	7.4	6.7
82	6.3	6.6	6.8	6.7	7.3	6.7
83	6.1	6.7	6.3	6.4	7.6	6.6
PINK SALMON						
1964						3.0
66						3.1
68						3.0
70	2.9			3.0	3.7	3.0
72	3.4			3.1	3.8	3.1
1974	4.3	3.9	4.1	3.6	4.4	4.0
76	3.7	3.8		3.3	4.1	3.4
78	3.6	3.2	3.3	3.1	3.8	3.2
80	3.6	3.4		3.4	3.8	3.4
82	3.6		4.1	3.5	3.5	3.5

(continued)

Appendix Table 45. (continued)

Species and Year	Average Round Weight 1/					Average Bristol Bay 2/
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
COHO SALMON						
1964						6.0
65						6.3
66						7.5
67						7.0
68		8.6	9.1	7.3	8.8	8.5 3/
1969		6.3	7.6	6.2	8.7	7.0
70				5.7	8.2	6.8
71				6.3		6.3
72		6.1		6.3	7.6	7.0
73	5.6	6.3	6.8	6.0	7.5	6.7
1974	6.7	6.5	7.2	6.7	8.6	7.9
75	6.7	7.2	7.2	6.1	9.2	8.6
76	5.5	6.9		6.0	8.3	7.6
77				6.5	9.4	7.8
78	6.4	6.3		6.8	8.2	7.5
1979	5.2	7.3	8.4	6.7	9.0	7.8
80	6.8	6.8	7.8	6.1	8.0	7.0
81	6.2	6.3	7.6	6.0	7.8	6.4
82	7.2	7.1	7.7	6.8	8.7	7.3
83		6.7	7.2	6.5	7.1	6.6

1/ Average weight in pounds rounded to nearest tenth of a pound, and weighted by the number of fish in the catch of each processor.
2/ Average weight in 1964-68 from annual "Alaska Catch and Production Commercial Fisheries Statistics" (Statistical Leaflet Series), and 1969-83 weighted by district from processor catch reports.
3/ Weighted by district from processor annual reports.

(Literature Cited: 4 and 10)

Appendix Table 46. Salmon prices paid to fishermen by species, Bristol Bay, 1964-83. 1/

Species	Price Per Fish in Dollars 2/					Price Per Pound in Dollars 2/													
	1964/65	1966	1967	1968		1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
	INDEPENDENT FISHERMEN					AIFMA														
SOCKEYE	1.09	1.13	1.18	1.19	Canned	.24	.24	.26	.27	.35	.48	.37	.52	.595	.68	.80	.57	.75	.70	.58
					Fresh/Frozen											1.25				
KING																				
Large	3.75	3.87	3.87	3.87																
Medium	1.87	1.94	1.94	1.94	Canned	.18	.18	.20	.20	.28	.33	.35	.41	.45	.50	.55	.57	.75	.75	.50
Small	1.00	1.00	1.03	1.03	Fresh/Frozen			.24	.24		.45	.40	.45	.65		.55		1.25	1.30	
CHUM	.58	.60	.60	.60	Canned	.11	.11	.12	.12	.18	.30	.18	.32	.375	.40	.55	.34	.42	.32	.25
					Fresh/Frozen											.55				
PINK	.32	.33	.33	.33		.11	.11	.12	.12	.18	.28	.19	.31	.36	.33	.33	.25	-	.18	-
COHO	1.09	1.13	1.18	1.19	Canned	.20	.20	.26	.27	.35						.70		.75	.70	-
					Fresh/Frozen			.20	.20	.30	.41	-	.405	-	.68	1.00	.57			
	COMPANY FISHERMEN					WACHA														
SOCKEYE	.67	.70	.73	.74	Canned	.14	.14	.16	.17	.22	.30	.45	.475	.595	.68	.80	.57	.65	.56	.65
					Fresh/Frozen											1.25		.75	.70	
KING																				
Large	2.70	2.40	2.78	2.78																
Medium	(2/1)	1.20	1.39	1.39	Canned	.11	.11	.12	.13	.18	.21	.35	.41	.45	.50	.52	.45	1.15	.75	-
Small		.64	.69	.69	Fresh/Frozen							.40	.46	.65	.70	1.00			1.17	-
CHUM	.37	.37	.37	.37	Canned	.06	.06	.08	.08	.11	.19	.30	.32	.36	.38	.41	.34	.38	.32	.32
					Fresh/Frozen											.55				
PINK	-	.20	.17	.17		.06	.06	.08	.13	.11	.18	.28	.308	.308	.33	-	.25	-	.30 3/	-
COHO	.67	.70	.73	.74	Canned	.14	.14	.16	.13	.19	.26	.45	.475	.5325	.62	.70	.57	.65	-	.65
					Fresh/Frozen							.38	.405			1.05		.75		

1/ Company/independent fishermen classification was in effect through 1974; beginning in 1975 all fishermen are hereafter considered to be independent and the majority negotiated prices with the processors through the two active fishermen's groups in Bristol Bay (AIFMA - Alaska Independent Fishermen's Marketing Assn.; and WACHA - Western Alaska Cooperative Marketing Assn.).
2/ Prices per fish and per pound represent a fixed base level price structure, and does not include any subsequent additional payments.
3/ Only a limited number of operators paid this price.

(Literature Cited: 9)

Appendix Table 47. Exvessel value of the commercial salmon catch by species, Bristol Bay, 1964-83. 1/

Year	Estimated Exvessel Value in Thousands of Dollars 2/					
	Sockeye	King	Chum	Pink	Coho	Total
1964	$ 6,100	$ 458	$ 465	$ 496	$ 40	$ 7,559
65	26,438	371	209	+	9	27,027
66	10,525	262	206	823	38	11,854
67	5,110	336	286	+	63	5,795
68	3,296	357	218	639	110	4,620
1969	8,423	443	216	+	103	9,185
70	24,368	465	466	151	18	25,468
71	14,951	652	528	+	16	16,147
72	3,914	339	512	47	20	4,832
73	1,892	284	829	+	115	3,120
1974	3,793	460	567	1,053	142	6,015
75	11,047	214	615	+	151	12,027
76	17,139	742	2,892	1,093	82	21,948
77	19,434	1,940	4,275	50	445	26,145
78	40,034	3,206	3,173	5,424	435	52,273
1979	128,992	4,541	2,480	5	2,387	138,405
80	76,118	1,881	2,738	2,173	1,392	84,302
81	120,907	5,557	4,106	7	1,461	132,037
82 3/	68,308	6,356	2,192	1,071	3,423	81,350
83 3/	128,677	2,891	2,894	+	306	134,769
20 Year Total	$719,466	$31,755	$29,867	$12,970 4/	$10,756	$804,878
1964-73 Total	105,017	3,967	3,935	2,156	532	115,607
1974-83 Total	614,449	27,788	25,932	11,097	10,224	689,271
20 Year Average	$35,973	$ 1,588	$ 1,493	$ 1,297 4/	$ 538	$ 40,244
1964-73 Average	10,502	397	394	431	53	11,561
1974-83 Average	61,445	2,779	2,593	2,219	1,022	68,927

1/ Value paid to the fishermen.
2/ Exvessel value derived from price per fish or pounds times commercial catch.
3/ Preliminary.
4/ Includes even-years only.

(Literature Cited: 1, 5, 9 and 10)

Appendix Table 48. Salmon case pack by species, Bristol Bay, 1964-83. 1/

Year	48 1-lb. Cans Per Case					
	Sockeye	King	Chum	Pink	Coho	Total
1964	372,928	25,677	70,523	67,431	5,024	541,583
65	1,447,771	24,248	31,826		338	1,504,183
66	737,948	14,850	28,814	95,071	2,345	879,028
67	334,177	19,499	45,321	8	3,100	402,105
68	229,514	12,971	36,638	63,011	4,321	346,455
1969	457,911	17,860	30,997	33	2,198	508,999
70	1,117,163	19,401	58,766	16,772	802	1,212,904
71	694,199	23,118	56,852		437	774,606
72	197,495	9,666	53,756	5,002	547	266,466
73	61,429	1,946	42,044		1,456	106,875
1974	87,723	6,461	23,789	39,550	7,012	164,535
75	290,646	1,920	22,667		373	315,606
76	393,698	6,889	104,935	36,616	1,068	543,206
77	353,133	3,119	137,838	5	2,383	496,478
78	551,648	6,982	76,926	163,230	2,916	801,702
1979	688,882	3,058	34,517		1,236	727,693
80	571,347	820	63,616	48,055	3,767	687,605
81	783,222	5,304	66,430	30	943	855,929
82	193,321	1,700	17,320	26,789	7,510	246,640
83	800,390	6,178	47,227	7	705	854,507
20 Year Total	10,454,545	211,667	1,050,802	561,527 2/	48,481	12,237,105
1964-73 Total	5,740,535	169,236	455,537	247,287	20,568	6,543,204
1974-83 Total	4,714,010	42,431	595,265	314,240	27,913	5,693,901
20 Year Average	522,727	10,583	52,540	56,153 2/	2,424	611,855
1964-73 Average	574,054	16,924	45,554	49,457	2,057	654,320
1974-83 Average	471,401	4,243	59,527	62,848	2,791	569,390

1/ Includes only fish canned in Bristol Bay.
2/ Includes even-years only.

(Literature Cited: 1, 4, and 18)

Appendix Table 49. Salmon fish per case by species, Bristol Bay, 1964-83.

Year	Fish Per Case				
	Sockeye	King	Chum	Pink 1/	Coho
1964	13.57	5.31	11.01	25.58	12.58
65	15.75	4.28	12.31		9.08
66	12.06	4.52	11.33	26.92	11.90
67	12.37	4.27	11.69		12.56
68	12.34	4.20	11.17	26.86	11.71
1969	14.18	4.70	12.78		13.05
70	15.01	5.11	13.02	26.00	11.73
71	12.62	3.99	11.83		11.07
72	12.35	4.46	12.00	26.76	12.28
73	10.57	4.23	11.27		12.33
1974	12.38	3.91	12.04	19.52	9.64
75	13.18	5.02	12.69		10.19
76	11.84	5.06	11.72	24.04	10.06
77	10.51	4.20	9.68		7.29
78	12.43	3.99	11.25	28.03	10.41
1979	12.60	3.64	11.32		10.01
80	12.53	3.88	12.82	23.95	10.76
81	11.66	5.21	11.21		7.46
82	11.48	3.53	10.60	23.52	10.22
83	12.50	3.90	11.30		10.65
20 Year Total	25,193	8,741	23,304	25,118	21,498
1964-73 Total	13,082	4,507	11,841	13,212	11,829
1974-83 Total	12,111	4,234	11,463	11,906	9,669
20 Year Average	12.60	4.37	11.65	25.12	10.75
1964-73 Average	13.08	4.51	11.84	26.42	11.83
1974-83 Average	12.11	4.23	11.46	23.81	9.67

1/ Includes even-years only.

(Literature Cited: 1)

Appendix Table 50. Commercial production of frozen salmon by species, Bristol Bay, 1964-83. 1/

Year	Production in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1964	467,849	18,784	29,799	36	36	516,504
65	367,461	19,360	4,361			391,182
66	262,825	10,628	107,250	12	322	381,037
67	201,146	356,223	69,910		40,908	668,187
68	99,120	184,222	48,485			331,827
1969	421,248	353,256	6,537		7,669	788,710
70	3,234,500	535,159	175,504	33,368	50	3,978,581
71	1,812,864	356,422	115,388	12	40,925	2,325,611
72	54,571	362,653	60,466	790	24,308	502,788
73	186,663	557,422	307,790	11	98,115	1,150,001
1974	147,475	281,821	7,212	113,241	582	550,331
75	101,751	230,045	133,339		444,344	909,479
76	883,620	570,837	163,030	215,176	117,603	1,950,266
77	586,098	1,155,791	336,283	258	235,607	2,314,037
78	6,306,661	1,848,951	761,029	1,580,236	145,355	10,642,232
1979	38,031,872	2,291,378	1,231,334	2,451	1,350,300	42,907,335
80	31,855,642	1,189,870	1,391,797	3,040,765	828,114	38,306,188
81	49,613,633	2,602,066	1,371,467	2,652	1,065,573	54,655,391
82	57,636,789	3,045,713	2,183,075	2,346,198	2,746,413	67,958,188
83	103,432,084	2,723,637	2,372,852	5,929	415,890	108,950,392
20 Year Total	295,703,872	18,694,238	10,876,908	7,329,822 2/	7,562,114	340,178,267
1964-73 Total	7,108,247	2,754,129	925,490	34,206	212,333	11,034,428
1974-83 Total	288,595,625	15,940,109	9,951,418	7,295,616	7,349,781	329,143,839
20 Year Average	14,785,194	934,712	543,845	732,982 2/	378,106	17,008,913
1964-73 Average	710,825	275,413	92,549	6,841	21,233	1,103,443
1974-83 Average	28,859,563	1,594,011	995,142	1,459,123	734,978	32,914,384

1/ Includes only fish processed in Bristol Bay.
2/ Includes even-years only.

(Literature Cited: 3)

Appendix Table 51. Commercial production of cured salmon by species, Bristol Bay, 1964-83. 1/

Year	Production in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1964	17,550	104,311	78	792	53,700	176,431
65	18,405	30,879	105		11,674	61,063
66	7,283	9,964	645		21,623	39,515
67	11,850	4,410	1,802		6,300	24,362
68	210,006	142,645	77,963	1,504	270,286	702,404
1969	330,443	394,217	371,321	133	409,114	1,505,228
70	37,298	153,503	86,795	509	14,026	292,131
71	14,922	148,354	12,778		5,682	181,736
72	10,526	3,959	8,614	32	28,547	51,678
73	23,851	4,617	27,768		17,539	73,775
1974	24,977	5,402	2,505	65	4,530	37,479
75	11,863	20,660	81			32,604
76	4,210	62	90			4,362
77	3	20	90		3,171	3,284
78	680,402	4,664	17,388	97,390	3,410	803,254
1979	3,651,146	16,824	136,585	403	1,000	3,805,958
80	4,242,063	9,603	286,113	9,649	6,653	4,554,081
81	4,956,561	23,663	148,051		6,526	5,134,801
82	3,222,798	75,752	277,013	12,780	1,466	3,589,809
83	5,045,048	22,259	266,005		595	5,333,907
20 Year Total	22,521,205	1,175,768	1,721,790	122,721 2/	865,842	26,407,862
1964-73 Total	682,134	996,859	587,869	2,837	838,491	3,108,323
1974-83 Total	21,839,071	178,909	1,133,921	119,884	27,351	23,299,539
20 Year Average	1,126,062	58,788	86,090	12,272 2/	43,292	1,320,393
1964-73 Average	68,213	99,686	58,787	567	83,849	310,832
1974-83 Average	2,183,907	17,891	113,392	23,977	2,735	2,329,954

1/ Includes only fish processed in Bristol Bay.
2/ Includes even-years only.

(Literature Cited: 3)

Appendix Table 52. Fresh export of salmon by air transportation, by species, Bristol Bay, 1964-83. 1/

Year	Production in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1964		534				534
65						
66	421	15,932	2,145		98,663	117,161
67	183	73,773	184		124,502	198,642
68	9,884	74,693	806		1,717	87,100
1969		75,293	2,372		217	77,882
70	676	185,564	661			186,901
71		232,912				232,912
72	20,754	359,533	6,442		4,837	391,566
73	163,447	326,372	238,851	183	134,260	863,113
1974	253,879	253,695	35,102	104,230	15,116	662,022
75	374,588	128,032	71,744	45	10,313	584,722
76	498,014	445,386	213,118	96,038	22,559	1,275,115
77	997,899	1,134,791	961,537	14,438	409,058	3,517,723
78	5,149,427	1,548,439	984,408	1,967,420	341,212	9,990,906
1979	22,838,654	1,652,904	1,176,549	3,822	933,539	26,605,468
80	23,284,065	514,638	617,989	612,276	1,196,502	26,225,470
81	25,943,037	1,302,979	817,991	9,385	800,432	28,873,824
82	20,416,684	2,056,650	1,027,817	166,672	1,576,761	25,244,584
83	26,641,032	978,050	552,536	35	248,582	28,420,235
20 Year Total	126,592,644	11,360,200	6,710,252	2,946,636 2/	5,918,270	153,555,880
1964-73 Total	195,365	1,344,606	251,461		364,196	2,155,811
1974-83 Total	126,397,279	10,015,594	6,458,791	2,946,636	5,554,074	151,400,069
20 Year Average	6,329,632	568,010	335,513	294,664 2/	295,913	7,677,794
1964-73 Average	19,537	134,461	25,146		36,420	215,581
1974-83 Average	12,639,728	1,001,559	645,879	589,327	555,407	15,140,007

1/ Includes all fish exported out of Bristol Bay by air in fresh condition regardless of final processing.
2/ Includes even-years only.

(Literature Cited: 3)

Appendix Table 53. Brine export of salmon by sea-going transportation, Bristol Bay, 1964-83. 1/

Year	Number 2/		Brine Export	
	Operators	Tenders	Number	Pounds
1964			191,423	1,003,695
65			994,966	4,486,175
66			389,595	2,168,233
67			127,818	807,144
68			97,404	466,488
1969			297,973	1,592,593
70	7	(60)	2,712,837	13,327,829
71	5	(12)	523,784	3,162,326
72	1	(1)	59,750	365,386
73	0	0	0	0
1974	2	(2)	78,620	456,430
75	5	(20)	933,728	5,135,799
76	5	(21)	728,420	4,466,126
77	5	15	623,523	3,603,382
78	9	(33)	1,602,224	9,304,376
1979	12	(61)	2,987,456	17,557,354
80	14	101	4,987,000	27,780,210
81	18	80	3,300,118	20,512,734
82	8	27	565,891	3,582,904
83	13	85	4,428,741	25,199,944
20 Year Total	104	518	25,631,271	144,979,128
1964-73 Total	13	73	5,395,550	27,379,869
1974-83 Total	91	445	20,235,721	117,599,259
20 Year Average	7 3/	37 3/	1,281,564	7,248,956
1964-73 Average	3	18	539,555	2,737,987
1974-83 Average	9	45	2,023,572	11,759,926

1/ Includes only fish exported from Bristol Bay in brine or chilled sea water by sea-going tenders for eventual processing.
2/ Number of operators and tenders unavailable prior to 1970. Figures in parenthesis are estimates.
3/ Fourteen year average.

(Literature Cited: 3)

Appendix Table 54. Commercial production and disposition of sockeye salmon, Bristol Bay, 1964-83. 1/

	Sockeye Salmon Production in Thousands of Pounds and Percent										
							Export 2/				
	Canned		Frozen		Cured		Fresh		Brine 3/		
Year	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Total
1964	27,610	95	468	2	18	+			1,004	3	29,100
65	104,278	96	367	+	18	+			4,486	4	109,149
66	54,379	96	263	+	7	+	+	+	2,168	4	56,817
67	26,264	96	201	1	12	+	+	+	807	3	27,824
68	14,865	95	98	1	201	1	10	+	466	3	15,649
1969	32,750	93	421	1	331	1			1,593	5	35,095
70	84,932	84	3,236	3	37	+	1	+	13,328	13	101,534
71	52,514	91	1,813	3	15	+			3,162	5	57,504
72	14,045	97	55	+	11	+	21	+	365	3	14,497
73	5,030	97	187	3	24	+	163	3			5,405
1974	7,020	89	147	2	25	+	254	3	456	6	7,902
75	21,319	79	102	+	12	+	375	1	5,136	19	26,944
76	28,426	83	884	3	4	+	498	1	4,466	13	34,278
77	27,495	84	586	2	+	+	988	3	3,603	11	32,682
78	37,136	63	6,307	11	680	1	5,149	9	9,304	16	58,576
1979	44,350	35	38,032	30	3,651	3	22,839	18	17,557	14	126,429
80	46,379	35	31,856	24	4,242	3	23,284	17	27,780	21	133,541
81	57,456	36	49,614	31	4,957	3	25,943	17	20,513	13	158,483
82 4/	12,064	12	57,637	60	3,223	3	20,417	21	3,583	4	96,924
83 4/	50,689	24	103,432	49	5,045	2	26,641	13	25,200	12	211,007
20 Year Total	749,001		295,706		22,522		126,593		144,977		1,338,800
1964-73 Total	416,667		7,109		683		195		27,379		452,034
1974-83 Total	332,334		288,597		21,839		126,398		117,598		886,766
20 Year Average	37,450	56	14,785	22	1,126	2	6,330	9	7,249	11	66,940
1964-73 Average	41,667	92	711	2	68	+	20	+	2,738	6	45,203
1974-83 Average	33,233	38	28,860	33	2,184	2	12,640	14	11,760	13	88,677

1/ Frozen and cured production includes some mixed fish (mostly chums).
2/ Includes all sockeye exported out of Bristol Bay regardless of final processing.
3/ Primarily sockeye salmon with minimal numbers of king and chum salmon.
4/ Preliminary.

(Literature Cited: 1, 3 and 4)

Appendix Table 55. South Unimak and Shumagin Island sockeye and chum salmon preseason quota and actual commercial catch, Alaska Peninsula, 1964-83. 1/

	In Thousands of Fish								
	South Unimak			Shumagin Islands			Total		
	Sockeye			Sockeye			Sockeye		
Year	Actual	Quota 2/	Chum	Actual	Quota 2/	Chum	Actual	Quota	Chum
1964	159		161	85		67	244		228
65	568		121	207		45	775		166
66	528		215	54		17	582		232
67	186		73	69		51	255		124
68	342		115	233		51	575		166
1969	781		254	76		13	857		267
70	1,530		403	153		49	1,683		452
71	565		554	45		115	610		669
72	443		468	76		108	519		576
73	239		189	23		23	262		212
1974	60	50	15		25		60	75	15
75	190	165	65	49	50	36	239	215	101
76	235	350	327	72	75	74	307	425	401
77	193	195	93	46	42	22	239	237	115
78	419	428	105	68	94	18	487	522	123
1979	683	900	64	179	200	41	862	1,100	105
80	2,731	2,513	457	572	555	71	3,303	3,068	528
81	1,474	1,442	521	351	318	54	1,825	1,760	575
82	1,670	1,850	934	451	408	160	2,121	2,258	1,094
83 3/	1,547	1,469	619	416	324	169	1,963	1,793	788
20 Year Total	14,543		5,753	3,225		1,184	17,768		6,937
1964-73 Total	5,341		2,553	1,021		539	6,362		3,092
1974-83 Total	9,302	9,362	3,200	2,204	2,091	645	11,406	11,453	3,845
20 Year Average	727		288	161		59	888		347
1964-73 Average	534		255	102		54	636		309
1974-83 Average	920	936	320	220	209	65	1,141	1,145	385

1/ South Unimak includes statistical area 284 in June and July, while Shumagin Islands includes statistical area 282 in June only.
2/ The sockeye quota system of management commenced in 1974, and is based on the final Bristol Bay projected inshore harvest and prior traditional harvest patterns.
3/ Preliminary.

(Literature Cited: 12)

Appendix Table 56. Subsistence catch of salmon by district and species, Bristol Bay, 1964-83.

Year	Permits Issued	Number of Fish 1/ Sockeye	King	Chum	Pink	Coho	Total
		NAKNEK-KVICHAK DISTRICT					
1964		85,900	500	+	1,100	800	88,300
65		71,900	500	100	+	300	72,800
66		74,500	600	300	2,700	400	78,500
67		68,500	500	100	+	500	69,600
68		71,000	500	100	300	200	72,100
1969		76,300	400	100	+	400	77,200
70	145	108,200	300	700	100	200	109,500
71	137	66,400	200	+	+	100	66,700
81	170	52,200	400	400	700	100	53,800
73	219	41,600	600	300	+	500	43,000
1974	263	102,600	1,000	1,100	1,600	200	106,500
75	301	122,600	700	300	+	200	123,800
76	346	82,200	900	900	1,500	600	86,100
77	352	81,400	1,300	600	100	300	83,700
78	392	93,000	1,200	1,000	1,400	300	96,900
1979	424	75,000	1,200	600		1,200	78,000
80	759	88,200	1,500	1,200	2,100	800	93,800
81	649	85,100	1,000	400	100	1,100	87,700
82	350	71,400	1,100	600	900	1,000	75,000
83	385	107,900	1,000	400	300	900	110,500
20 Year Total	4,892	1,625,900	15,400	9,200	12,400 2/	10,100	1,673,500
20 Year Average	349	81,300	800	500	1,200 2/	500	83,700
		EGEGIK DISTRICT					
1972	2					100	100
73	3					100	100
74	7	300		+	+	+	300
75	3	200		+	+	+	200
76 3/	2						
1977	20	100		+	100	+ 200	400
78	13	200			100	200	500
79	8	300				100	400
80	3	100					100
81	4	+		+		+	+
1982	19	2,400		+		+	2,400
83	14	700		+		+	700
12 Year Total	98	4,300		+	200	+ 2/ 700	5,200
12 Year Average	8	400		+	+	+ 2/ 100	400

(continued)

Appendix Table 56. (continued)

Year	Permits Issued	Number of Fish 1/ Sockeye	King	Chum	Pink	Coho	Total
			UGASHIK DISTRICT				
1964	2	300					300
66	4	1,000					1,000
67	5	700	+	100	+	500	1,300
68	8	300	+	100	+	300	700
69	3	100				200	300
1970	9	1,400	+	+		+	1,400
71	9	300		+		100	400
72	13	200	100	100	+	300	700
73	14	200	+	100	+	600	900
74	8	200	100	+	+	500	800
1975	1	700	+	+	+	1,200	1,900
76	21	1,200	100	100	100	300	1,800
77	19	1,000	100	300	+	500	1,900
78	8	500	100	100	+	900	1,600
79	8	200	+	+	+	100	300
1980	10	200	+	+	+	200	400
81	12	600	+	+		200	800
82	11	400	+	+	+	300	700
83	8	500	+	+		100	600
19 Year Total	173	10,000	500	900	100 2/	6,300	17,800
19 Year Average	9	500	+	+	+ 2/	300	900

(continued)

Appendix Table 56. (continued)

Year	Permits Issued	Number of Fish 1/ Sockeye	King	Chum	Pink	Coho	Total
		NUSHAGAK DISTRICT					
1964	74	31,800	2,900	8,700	4,100	4,900	52,400
65	121	47,500	4,600	18,400	200	5,400	76,100
66	110	23,600	3,700	6,000	4,900	2,400	40,600
67	128	34,900	3,700	14,000	800	4,000	57,400
68	115	30,000	6,600	8,600	5,800	1,900	52,900
1969	162	27,700	7,100	8,200	100	7,100	50,200
70	147	38,200	6,900	8,800	1,000	1,000	55,900
71	164	42,400	4,400	4,200	+	2,300	53,300
72	168	24,100	4,000	8,200	1,200	1,000	38,500
73	216	28,000	6,600	7,600	100	2,200	44,500
1974	261	39,300	7,600	9,600	4,100	4,600	65,200
75	340	47,300	7,100	5,600	1,300	4,300	65,600
76	317	34,700	6,900	7,200	2,700	2,100	53,600
77	306	43,300	5,200	7,300	200	4,500	60,500
78	331	33,000	6,500	14,300	11,000	2,500	67,300
1979	364	40,200	8,900	6,800	500	5,200	61,600
80	425	76,500	11,700	11,600	7,600	5,100	112,500
81	395	44,500	11,600	10,300	2,400	8,700	77,500
82	376	34,700	12,200	11,500	7,300	8,900	74,600
83	389	38,400	11,800	9,200	400	5,300	65,100
20 Year Total	4,909	760,100	140,000	186,100	49,700 2/	83,400	1,225,300
20 Year Average	245	38,000	7,000	9,300	5,000 2/	4,200	61,300
		TOGIAK DISTRICT					
1965	36	4,600	100	1,600	100	2,200	8,600
74	68	7,400	1,200	2,000	500	1,800	12,900
75	41	4,600	800	1,600	+	2,800	9,800
76	30	2,800	500	900	100	500	4,800
77	41	2,100	400	800	+	1,100	4,400
1978	29	900	300	700	300	500	2,700
79	25	800	200	300		700	2,000
80	46	3,600	900	300	300	1,200	6,300
81	52	1,900	400	800	100	2,200	5,400
82	50	1,900	400	300	400	1,300	4,300
1983	38	1,900	700	900	200	800	4,500
11 Year Total	456	32,500	5,900	10,200	1,600 2/	15,100	65,700
11 Year Average	41	3,000	500	900	300 2/	1,400	6,000

(continued)

Appendix Table 56. (continued)

Year	Permits Issued	Number of Fish 1/ Sockeye	King	Chum	Pink	Coho	Total
		TOTAL BRISTOL BAY					
1964		118,000	3,400	8,700	5,200	5,700	141,000
65		119,400	5,100	18,500	200	5,700	148,900
66		99,100	4,300	6,300	7,600	2,800	120,100
67		104,100	4,200	14,200	800	5,000	128,300
68		101,300	7,100	8,800	6,100	2,400	125,700
1969		104,100	7,500	8,300	100	7,700	127,700
70	301	147,800	7,200	9,500	1,100	1,200	166,800
71	310	109,100	4,600	4,200	+	2,500	120,400
72	353	76,500	4,500	8,700	1,900	1,400	93,000
73	452	69,800	7,200	8,000	100	3,300	88,400
1974	607	149,800	9,900	12,700	6,200	7,100	185,700
75	701	175,400	8,600	7,500	1,300	8,500	201,300
76	716	120,900	8,400	9,100	4,400	3,500	146,300
77	738	127,900	7,000	9,100	300	6,600	150,900
78	773	127,600	8,100	16,200	12,700	4,400	169,000
1979	829	116,500	10,300	7,700	500	7,300	142,300
80	1,243	168,600	14,100	13,100	10,000	7,300	213,100
81	1,112	132,100	13,000	11,500	2,600	12,200	171,400
82	806	110,800	13,700	12,400	8,600	11,500	157,000
83	834	149,400	13,500	10,500	900	7,100	181,400
20 Year Total	9,775	2,428,200	161,700	205,000	63,800 2/	113,200	2,978,700
1964-73 Total	1,416	1,049,200	55,100	95,200	21,900	37,700	1,260,300
1974-83 Total	8,359	1,379,000	106,600	109,800	41,900	75,500	1,718,400
20 Year Average	698	121,400	8,100	10,300	6,400 2/	5,700	148,900
1964-73 Average	354	104,900	5,500	9,500	4,400	3,800	126,000
1974-83 Average	836	137,900	10,700	11,000	8,400	7,600	171,800

1/ Catches rounded to nearest hundred fish.
2/ Includes even-years only.
3/ No permits returned.

(Literature Cited: 1 and 8)

Appendix Table 57. Subsistence catch of sockeye salmon by village, Kvichak River drainage, Bristol Bay, 1964-83.

Year	Number of Fish by Village 1/								
	Levelock	Igiugig	Newhalen	Nondalton	Port Alsworth	Iliamna	Pedro Bay	Kokhanok	Total
1964	1,000 2/	4,000	16,000	35,000		3,000	12,000	8,000	79,000
65	1,000 2/	3,300	9,700 3/	35,500			4/ 9,800	10,200	69,500
66	600	1,200	6,600 3/	45,800			4/ 6,000	10,500	70,700
67	1,400	3,400	9,100 3/	29,600			4/ 9,900	10,200	63,600
68	1,400	4,800	8,700 3/	33,700			4/ 9,800 2/	10,200 2/	68,600
1969	1,000 2/	5,100	4,900 3/	44,000			4/ 4,200	15,000	74,200
70	1,600 2/	11,200	16,400 3/	42,900			4/ 11,200	22,300	105,600
71	1,600 2/	6,500	6,500	22,100		2,000	10,100	12,800	61,600
72	1,600 2/	2,200	6,600	24,100		3,400	4,000	8,300	50,200
73	4,800	2,200	7,000	8,500	1,300	3,200	2,900	9,200	39,100
1974	8,600	6,200	9,300	29,500	1,500	7,100	14,400	21,500	98,100
75	5,300	6,400	19,400	48,700	2,100	7,300	8,300	18,000	115,500
76	5,300	6,800	16,300 3/	20,500	5,500		4/ 4,400	17,100	75,900
77	2,600	6,000	1,600	27,200	4,900	9,800	5,600	14,300	72,000
78	8,900	8,800	6,100	17,300	3,000	4,900	11,200	23,700	83,900
1979	4,400	6,600	4,200	14,700	4,200	11,700	3,500	16,200	65,500
80	6,100	8,100	7,000	11,300	6,000	4,100	7,400	22,600	72,600
81	6,600	5,400	10,900	15,200	6,800	4,500	9,700	16,500	75,600
82	5,400	1,900	9,900	11,200	4,500	3,600	8,200	16,600	61,300
83	4,800	3,300	16,500	29,400	4,700	7,300	10,400	20,100	96,500
20 Year Total	74,000	103,400	121,000	546,200		71,900	163,000	303,300	1,499,000
1964-73 Total	16,000	43,900	36,100	321,200		11,600	79,900	116,700	682,100
1974-83 Total	58,000	59,500	84,900	225,000	43,200	60,300	83,100	186,600	816,900
20 Year Average	3,700	5,200	9,300 5/	27,300		5,500	8,200	15,200	75,000
1964-73 Average	1,600	4,400	9,000	32,100		2,900	8,000	11,700	68,200
1974-83 Average	5,800	6,000	9,400	22,500	4,300	6,700	8,300	18,700	81,700

1/ Catches rounded to nearest hundred fish.
2/ Catch interpolated.
3/ Includes Iliamna.
4/ Included with Newhalen.
5/ Excluding 1965-70 and 1976.

(Literature Cited: 1 and 8)

APPENDIX A

BRISTOL BAY SALMON MANAGEMENT OUTLOOK FOR 1983

The inshore sockeye salmon forecast for 1983 of 27.1 million will allow a potential commercial harvest of 21.3 million after escapement requirements are met (Table 1). The combined sockeye escapement goals for all eleven of the major river systems in Bristol Bay total 5.8 million, which is the standard escapement requirement in the years following the peak cycle year (1980).

The projected sockeye harvest of 21.3 million fish in 1983 will surpass the average catch of 4.1 million for the previous comparable four cycle year average by over 17 million fish. Large numbers of sockeye will be in excess of escapement requirements in all districts. Ultimate fishing time allowed in the various districts will depend upon actual run strength; however, consistent early season fishing will be necessary to gauge district run strength and allow the processors and fishermen adequate break-in time for an efficient operation.

King and chum salmon returns are expected to be strong as well producing a total harvest of 200,000 and 1.0 million, respectively. Pink salmon returns are negligible in odd years, while coho production is expected to continue at the high levels of recent years.

APPENDIX B

BRISTOL BAY SOCKEYE SALMON FORECAST EVALUATION FOR 1983 (December, 1982)

Several independent forecasts for the 1983 return of sockeye salmon to Bristol Bay are available (Appendix B Table 1). These forecasts are: (1) The standard forecast made by the Bristol Bay research staff, Alaska Department of Fish and Game (ADF&G); (2) A forecast made based on the arithmetic mean CPUE from variable mesh gill net sampling by Japanese south of the Aleutian Islands; (3) A forecast made based on the geometric mean CPUE from variable mesh gill net sampling by the Japanese south of the Aleutian Islands; (4) A forecast based on a relation between estimated total Bristol Bay parent escapement, mean June air temperature at Cold Bay during the two years prior to year of return and the total Bristol Bay return of sockeye salmon (ie: the escapement-temperature model); and (5) A forecast based on CPUE in limited purse seine sampling south of Adak by the Fisheries Research Institute.

The forecasts for the 1983 return of sockeye salmon to Bristol Bay made with the available methods ranged from 20.0 to 43.5 million fish (Appendix B Table 1). Eighty percent confidence intervals (ie: the actual return will be outside the interval on the average of twenty out of every hundred years) were also computed (Appendix B Table 1). The best forecast, in terms of that with the narrowest confidence interval, is the forecast based on the escapement-temperature model. The worst based on that criterion is the ADF&G forecast (Appendix B Table 1). These comparisons must be qualified because the ADF&G forecast is made based only on past data, whereas the other forecasts procedures utilized all years of data to "hindcast" the past. In view of this, the error inherent in the ADF&G forecast would be expected to be higher. The ADF&G forecast is the only forecast that provides predicted returns by river system and age class within river system. This detail is essential for management and industry needs.

APPENDIX B (continued)

A synopsis of key areas to watch as the run emerges inseason 1983 is provided in Appendix B Table 3. These are particular age classes that are likely to be large components of the run in each of the constituent river systems. In most cases these are areas where the several methods which are used in the ADF&G forecast procedure gave inconsistent results. A departure from the forecasted age composition is a clear indication of error in the forecast and careful monitoring of the early age composition of the run should provide suitable warning of other than anticipated run strength in 1983.

In addition to the ADF&G forecast, forecasts by age class were available for the forecast based on geometric mean CPUE from gill net sampling by the Japanese and for the forecast based on purse seine sampling off Adak (Appendix B Table 2). There is a striking consistency in the ocean age composition of all forecasts. These forecasted returns are dominated by 2-ocean fish. There is some inconsistency, however, in the freshwater age component of the 2-ocean fish. Both of the forecasts based on high seas sampling gave a higher proportion of 5_3 returning than the ADF&G forecast. The geometric mean of Japanese sampling gave a very large return of 5_3 (15.9 million). If this were to occur, the ADF&G forecast would likely be much lower than the actual return.

It is useful to address the question of to which river system would a large run of 5_3's return. Based on the ADF&G forecast, those fish would most likely return to Wood River, Kvichak, and Egegik. The forecast of the 5_3 return to Wood River based on smolt data was 1.3 million. This was higher than the final forecast (0.61 million) which averaged results of other forecast methods. The unusually high proportion of three year old smolts in the 1981 smolt outmigration from Wood River suggests that the retun of 5_3's to Wood River could be substantially higher than forecast. For the Kvichak there was a relative low percentage (11.3%) of three year old smolt in the 1981 smolt outmigration. If the return of 5_3's is much higher than forecast then the marine survival of the 1981 smolt outmigration would have to be very high and the return of 4_2's would also be higher than forecast. The only other system where one could see a large return of 5_3's is Egegik. There is a large 2-ocean return (2.0 million) forecasted for Egegik. The proportion of three year old smolts based on limited sampling of the 1981 smolt outmigration is 63%. If the ADF&G forecast of 4_2's turns out to be correct, and 4_2's and 5_3's return in the proportion observed in the 1981 Egegik smolt samples, then the return of 5_3's to Egegik would be 1.8 million compared with the forecasted value of 1.3 million.

If the high seas forecasts turn out to be correct, we are going to see substantially higher returns of 4_2's to Kvichak, Egegik, Wood River, and Ugashik and 5_3's to Wood River, Egegik, and Kvichak. The age structure for these systems should be carefully monitored during the 1983 season.

All in all the probability of a large return to Bristol Bay in 1983 is excellent. The large high seas forecasts, the record or near recurd return of jacks throughout Bristol Bay in 1982, and the consistency in the age composition of the available forecasts are particularly encouraging.

APPENDIX B (continued)

Appendix B Table 1. Summary of available forecasts of 1983 return of sockeye salmon to Bristol Bay.

Forecast Method	Standard Deviation About Model (millions)	Forecasted Return (millions)	80% Confidence Interval	
			Lower Bound	Upper Bound
Standard ADF&G	11.8	27.1	9.5	41.7
Japanese Gillnet Sampling Mean CPUE	9.3	36.2	21.9	50.2
Japanese Gillnet Sampling Geometric Mean CPUE	9.5	43.5	28.2	59.4
Escapement Temperature Model	9.2	26.3	15.0	37.6
Purse Seine Sampling at Adak	?	20.0	?	?
Average Weighted by Inverse of Standard Deviation[1/]	-	33.4	-	-

1/ FRI Adak forecast not included due to low magnitude of sampling intensity in 1982 relative to past levels.

Appendix B Table 2. Total 1983 Bristol Bay forecast by major age classes for each of the alternative forecast methods.

Forecast Technique		4_2	5_3	Total 2-ocean	5_2	6_3	Total 3-Ocean	Total
Standard ADF&G	Numbers (millions)	13.5	5.3	18.9	5.6	2.7	8.3	27.1
	Percent	49.8	19.5	69.3	20.7	10.0	30.7	
Japanese Sampling Geometric Mean	Numbers (millions)	17.6	15.9	33.5	8.4	1.6	10.0	43.5
	Percent	40.5	36.6	77.0	19.3	3.6	23.0	
FRI Sampling	Numbers (millions)	9.8	5.2	15.0	4.3	0.7	5.0	20.0
	Percent	49.0	26.0	75.0	21.5	3.5	25.0	

APPENDIX B (continued)

Appendix B Table 3. Key areas to watch in 1983 where forecast is likely to be in error. Synopsis summarizing inconsistencies among forecasting techniques.

System	Age Class	Forecast (millions)	Synopsis	Departure From Forecast
Kvichak	4_2	6.6	High smolt, record return of 3_2 in 1982, Kvichak has not produced well in 1981 or 1982.	Higher Return
	5_2	1.0	Poor return of 4_2 in 1982, high smolt.	Unknown
	5_3	1.8	Large 5_3 component in high seas forecasts, low smolt.	Higher Return
Naknek	6_3	0.7	High R/S, low return.	Unknown
Egegik	4_2	0.7	Historically low proportion 4_2 returning, good return of 3_2, consistency in limited smolt data.	Unknown
	5_3	1.3	Large 5_3 component in high seas forecast, consistency in limited smolt data, good return of 4_3.	Higher Return
Ugashik	4_2	3.3	Very large parent escapement, little comparable R/S data available, record return of 3_2.	Unknown
Wood	5_3	0.6	Historically low proportion 5_3, high smolt, good return of 4_3, large 5_3 component in high seas forecast.	Higher Return
Igushik	All Age Classes	0.6	A low R/S assumed for high parent escapements	Higher Return
Nuyakuk	5_2	1.2	High R/S, moderate return of 4_2.	Lower Return

APPENDIX C

NUSHAGAK DISTRICT SOCKEYE SALMON ESCAPEMENT GOAL REVISIONS FOR 1983 AND FUTURE YEARS (May, 1983)

Historically, Nushagak district has been the second most productive system in Bristol Bay, averaging a 5.0 million sockeye salmon catch for 20 years from 1899 to 1918, 2.8 million for the following 30 years, and finally dropping to an 882,000 average in the 29 year period from 1949 to 1977 (Appendix C Figure 1). Total run statistics (catch and escapement) exhibited the same drastic decline in production. High sustained exploitation rates (up to 80%) in the early years of the fishery resulted in precipitious declines in production, and although the other districts in Bristol Bay have experienced a decline as well, it has been neither so distinct nor so drastic in nature as in Nushagak district.

In an effort to reverse the downward trend in Nushagak district sockeye production, larger escapements were provided by reduction in fishing time. The downward trend in force from the 1920's through the late 1950's were generally halted, and total run production was stabilized, but at a level well below that seen in the period of fishery development during the early 1900's.

Commencing in 1978 a remarkable transformation was experienced in Nushagak sockeye production, when 6.6 million fish returned, the largest inshore run recorded since the mid-1940's. The remarkable return in 1978 was followed by an equally strong return in 1979 (6.4 million), and in 1980 over 12.8 million sockeye returned to Nushagak district, breaking numerous long-held total run estimates, and establishing a record 8.3 million escapement to the district's river systems. Peak sockeye production continued in 1981 and 1982 when Nushagak district river systems produced total returns of 10.6 and 8.0 million fish, respectively.

Since 1978, Nushagak district's sockeye average catch production has increased to 4.9 million fish, while the total run from 1978-82 has averaged 8.9 million compared with the previous 20 year average (1958-77) of 2.3 million. The recent five year total run average of 8.9 million sockeye is higher than any previous five year average in the long history of this fishery. Although it is apparent that exceptional survival conditions have greatly aided in boosting sockeye production in the last five years, increased and consistent escapements to major contributing Nushagak district river systems appear to be essential to increased and sustained production for this fishery.

In an effort to maintain the recent high production, it will be necessary to increase sockeye escapement goals to the major river systems of Nushagak district. Without escapement goal increases, it's probable that Nushagak's sockeye runs will eventually revert back to the previous recent long-term average of 2 or 3 million fish. Accordingly, in 1983 Nushagak district escapement goals will be increased by 25% to the upper management range already in effect:

Wood River	- from	800,000 to	1.0 million
Igushik River	- from	150,000 to	200,000
Nuyakuk River	- from	250,000 to	300,000
Nushagak River	- from	40,000 to	50,000
Snake River	- from	30,000 to	40,000
Total District:		1,270,000 to	1,590,000

Additionally, sockeye escapement goal evaluations presently in progress will continue for all river systems of Bristol Bay, and the Department will present further updated escapement goal recommendations for public input at Advisory Committee meetings in the fall of 1983.

Through these adjustments to escapement goals, the Department hopes to sustain the recent high levels of salmon production in future years.

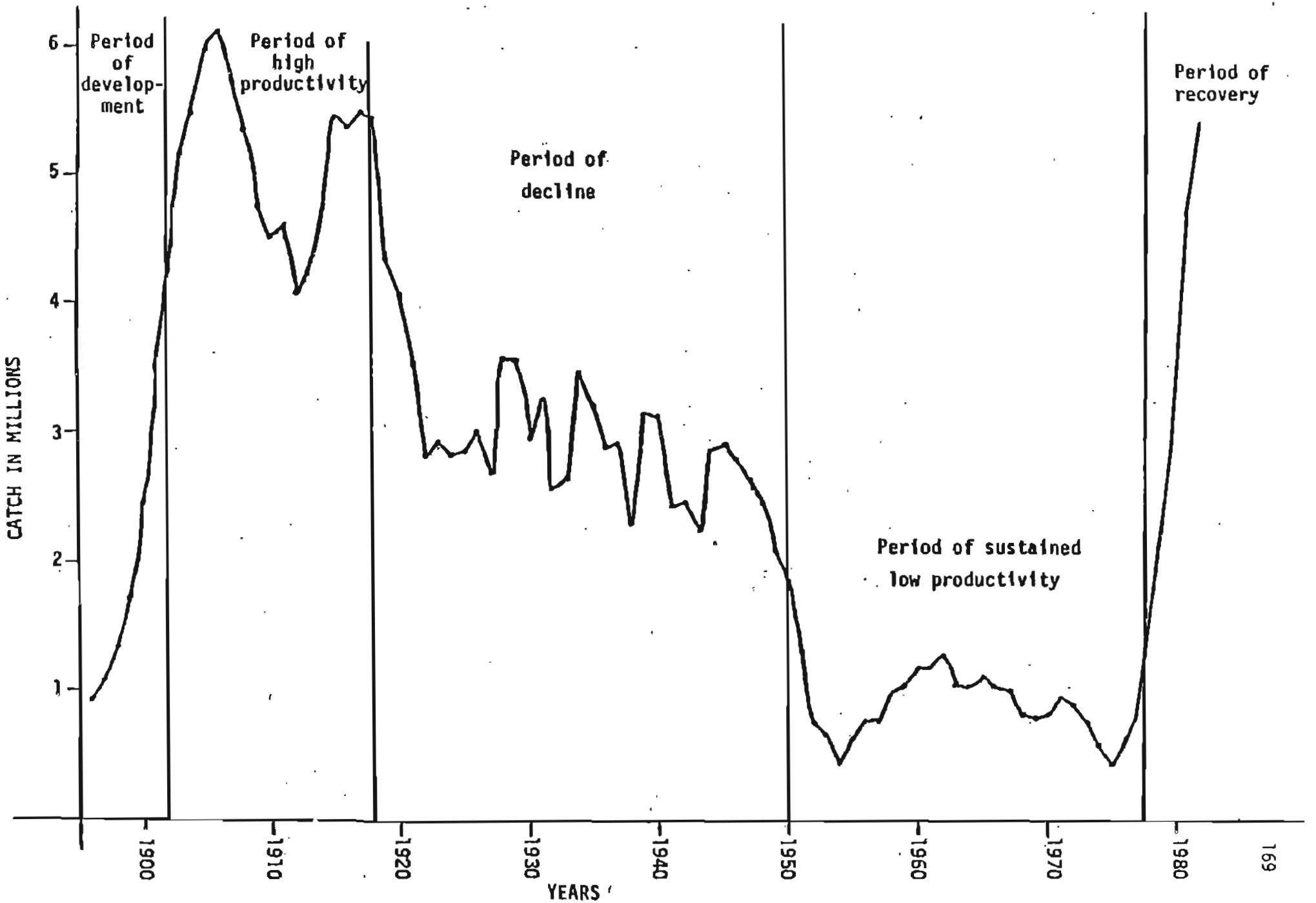


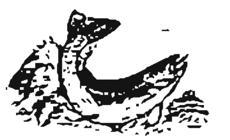
Fig. 1. Nushagak Bay sockeye salmon catch, 1893-1982 smoothed by 4-year moving average.

NUSHAGAK BAY DISTRICT CORRECTION TABLE

To correct the TIME and HEIGHT for HIGH or LOW tides for the points given below, add or subtract TIME and FEET from the NUSHAGAK District Tide Table.

	Time High	Time Low	Feet High	Feet Low
BRISTOL BAY				
Port Moller (Entrance Point)	[illegible]	[illegible]	[illegible]	[illegible]
Port Heiden	[illegible]	[illegible]	[illegible]	[illegible]
EGEGIK RIVER				
Entrance	[illegible]	[illegible]	[illegible]	[illegible]
Egegik	[illegible]	[illegible]	[illegible]	[illegible]
Middle Bluff, Kvichak Bay	[illegible]	[illegible]	[illegible]	[illegible]
NAKNEK RIVER				
Entrance#	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Point	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Point	[illegible]	[illegible]	[illegible]	[illegible]
Naknek Air Base	[illegible]	[illegible]	[illegible]	[illegible]
KVICHAK RIVER				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Kvichak	[illegible]	[illegible]	[illegible]	[illegible]
Levelock	[illegible]	[illegible]	[illegible]	[illegible]
NUSHAGAK BAY				
Protection Point	[illegible]	[illegible]	[illegible]	[illegible]
Snag Point	[illegible]	[illegible]	[illegible]	[illegible]
Black Rock, Walrus Islands	[illegible]	[illegible]	[illegible]	[illegible]
ST. LAWRENCE ISLAND				
Northeast Cape	[illegible]	[illegible]	[illegible]	[illegible]
Fossil River Ent.	[illegible]	[illegible]	[illegible]	[illegible]
Niyrakpak Lagoon Entrance	[illegible]	[illegible]	[illegible]	[illegible]

#No Low water falls below −2 feet.
* Multiply height of District Tide by proper ratio to correct height of High or Low Tide.



HIGH Tides NUSHAGAK District MAY 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft	P.M. Time	P.M. Ft
1 SUN	•	6:53	20.9	6:28	14.1
2 Mon	•	7:38	20.7	7:18	13.7
3 Tues	•	8:22	20.3	8:08	13.5
4 Wed	•	9:04	19.8	8:51	13.4
5 Thur	•	9:45	19.3	9:40	13.6
6 Fri	•	10:27	18.8	10:30	13.9
7 Sat	•	11:05	18.3	11:23	14.3
8 SUN	•	11:44	17.7	—	—
9 Mon	•	0:19	15.0	12:23	17.1
10 Tues	•	1:11	15.9	1:00	16.5
11 Wed	•	2:03	17.0	1:39	15.8
12 Thur	●	2:52	18.2	2:20	15.2
13 Fri	●	3:44	19.4	3:05	14.9
14 Sat	●	4:33	20.5	3:51	14.7
15 SUN	●	5:24	21.5	4:43	14.6
16 Mon	●	6:14	22.2	5:37	14.7
17 Tues	●	7:03	22.7	6:38	14.9
18 Wed	●	7:54	22.9	7:38	15.3
19 Thur	●	8:45	22.7	8:43	15.7
20 Fri	●	9:35	22.3	9:50	16.4
21 Sat	●	10:26	21.6	10:59	17.1
22 SUN	●	11:18	20.7	—	—
23 Mon	●	0:07	18.0	12:07	19.5
24 Tues	●	1:11	18.9	1:00	18.3
25 Wed	•	2:13	19.8	1:51	17.1
26 Thur	•	3:12	20.5	2:40	15.9
27 Fri	•	4:07	21.0	3:29	14.9
28 Sat	•	4:57	21.1	4:18	13.9
29 SUN	·	5:44	21.1	5:08	13.3
30 Mon	·	6:27	20.9	5:52	12.8
31 Tues	·	7:09	20.5	6:38	12.6

NU-5
• BIGGER THE DOT—BETTER THE FISHING

LOW Tides NUSHAGAK District MAY 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft	P.M. Time	P.M. Ft
1 SUN	•	—	—	1:08	5.3
2 Mon	•	0:45	0.3	1:57	5.4
3 Tues	·	1:31	0.9	2:43	5.5
4 Wed	·	2:17	1.5	3:31	5.4
5 Thur	·	3:03	2.1	4:14	5.2
6 Fri	·	3:50	2.7	4:58	4.9
7 Sat	·	4:41	3.4	5:38	4.3
8 SUN	•	5:29	4.2	6:20	3.8
9 Mon	•	6:22	4.9	6:58	2.9
10 Tues	•	7:15	5.5	7:40	2.0
11 Wed	•	8:10	6.0	8:19	1.1
12 Thur	●	9:05	6.4	9:01	0.3
13 Fri	●	9:57	6.5	9:43	−0.5
14 Sat	●	10:52	6.5	10:30	−1.2
15 SUN	●	11:46	6.2	11:18	−1.8
16 Mon	●	—	—	12:38	5.6
17 Tues	●	0:09	−2.0	1:29	5.2
18 Wed	●	1:06	−1.9	2:21	4.3
19 Thur	●	2:02	−1.4	3:13	3.3
20 Fri	●	3:01	−0.6	4:08	2.1
21 Sat	●	4:00	0.5	5:00	1.0
22 SUN	●	5:02	1.8	5:51	−0.1
23 Mon	●	6:06	3.1	6:42	−1.0
24 Tues	●	7:09	4.2	7:33	−1.5
25 Wed	•	8:13	5.1	8:23	−1.7
26 Thur	•	9:13	5.7	9:08	−1.5
27 Fri	•	10:12	6.0	9:58	−1.1
28 Sat	·	11:07	6.2	10:41	−0.8
29 SUN	·	12:01	6.2	11:25	0.3
30 Mon	·	—	—	12:48	6.2
31 Tues	·	0:09	0.7	1:32	6.0

NU-5
DAYLIGHT TIME

HIGH Tides NUSHAGAK District JUNE 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft	P.M. Time	P.M. Ft
1 Wed	·	7:47	20.2	7:27	12.8
2 Thur	·	8:25	19.8	8:17	12.8
3 Fri	·	9:02	19.3	9:08	13.1
4 Sat	·	9:37	18.8	10:02	13.7
5 SUN	•	10:13	18.2	10:56	14.8
6 Mon	•	10:49	17.6	11:50	15.7
7 Tues	•	11:26	17.0	—	—
8 Wed	●	0:45	16.9	12:07	16.4
9 Thur	●	1:37	18.3	12:48	15.8
10 Fri	●	2:28	19.6	1:30	15.4
11 Sat	●	3:18	20.9	2:23	15.2
12 SUN	●	4:09	22.0	3:18	15.0
13 Mon	●	4:59	22.8	4:15	15.1
14 Tues	●	5:51	23.3	5:18	15.2
15 Wed	●	6:42	23.5	6:23	15.5
16 Thur	●	7:32	23.3	7:32	15.8
17 Fri	●	8:22	22.9	8:40	16.5
18 Sat	●	9:12	22.1	9:50	17.2
19 SUN	●	10:03	21.1	10:57	18.0
20 Mon	●	10:53	19.9	—	—
21 Tues	●	0:03	18.9	11:41	18.6
22 Wed	•	1:08	19.7	12:33	17.3
23 Thur	•	2:08	20.3	1:22	16.0
24 Fri	•	3:00	20.7	2:11	14.9
25 Sat	•	3:51	20.8	2:58	14.0
26 SUN	·	4:37	20.8	3:46	13.2
27 Mon	·	5:19	20.6	4:31	12.7
28 Tues	·	6:00	20.3	5:17	12.4
29 Wed	·	6:37	20.0	6:00	12.3
30 Thur	·	7:13	19.6	6:53	12.5

NU-4
• BIGGER THE DOT—BETTER THE FISHING

LOW Tides NUSHAGAK District JUNE 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft.	P.M. Time	P.M. Ft.
1 Wed	·	0:53	1.4	2:16	5.8
2 Thur	·	1:38	2.1	2:58	5.3
3 Fri	·	2:24	2.9	3:38	4.7
4 Sat	·	3:09	3.7	4:17	4.0
5 SUN	•	4:01	4.6	4:58	3.1
6 Mon	•	4:51	5.4	5:37	2.2
7 Tues	•	5:47	6.2	6:16	1.2
8 Wed	●	6:41	6.8	6:55	0.0
9 Thur	●	7:38	7.2	7:38	−0.9
10 Fri	●	8:36	7.3	8:23	−1.8
11 Sat	●	9:31	7.2	9:10	−2.5
12 SUN	●	10:26	6.8	10:01	−3.0
13 Mon	●	11:20	6.2	10:54	−2.7
14 Tues	●	12:14	5.3	11:48	−2.8
15 Wed	●	—	—	1:08	4.2
16 Thur	●	0:46	−2.1	2:01	3.0
17 Fri	●	1:47	−1.0	2:54	1.8
18 Sat	●	2:46	0.5	3:46	0.2
19 SUN	●	3:49	2.0	4:39	−0.3
20 Mon	●	4:52	3.5	5:31	−1.7
21 Tues	●	5:55	4.8	6:21	−2.2
22 Wed	•	6:59	5.7	7:08	−2.3
23 Thur	•	8:00	6.4	7:58	−2.0
24 Fri	•	8:59	6.8	8:45	−1.6
25 Sat	•	9:55	6.9	9:29	−0.8
26 SUN	·	10:46	7.0	10:11	−0.7
27 Mon	·	11:35	6.9	10:56	0.8
28 Tues	·	12:21	6.7	11:38	1.3
29 Wed	·	—	—	1:03	6.4
30 Thur	·	0:21	2.0	1:45	5.9

NU-4
DAYLIGHT TIME

HIGH Tides NUSHAGAK District JULY 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft.	P.M. Time	P.M. Ft.
1 Fri	•	7:45	19.3	7:46	12.8
2 Sat	•	8:18	18.8	8:38	13.4
3 SUN	•	8:52	18.4	9:31	14.3
4 Mon	•	9:24	17.9	10:25	15.4
5 Tues	●	10:00	17.4	11:20	16.0
6 Wed	●	10:39	16.9	—	—
7 Thur	●	0:12	18.0	11:21	16.5
8 Fri	●	1:05	19.3	12:08	16.2
9 Sat	●	1:57	20.6	12:54	16.0
10 SUN	●	2:50	21.6	1:55	15.8
11 Mon	●	3:43	22.5	2:58	15.9
12 Tues	●	4:34	23.0	3:58	16.0
13 Wed	●	5:27	23.3	5:08	16.3
14 Thur	●	6:18	23.2	6:18	16.8
15 Fri	●	7:08	22.8	7:25	17.1
16 Sat	●	7:57	22.1	8:34	17.8
17 SUN	●	8:47	21.2	9:43	18.4
18 Mon	●	9:38	20.1	10:48	18.1
19 Tues	•	10:27	18.9	11:51	18.7
20 Wed	•	11:19	17.6	—	—
21 Thur	•	0:50	20.1	12:08	16.5
22 Fri	•	1:46	20.2	12:57	15.4
23 Sat	•	2:38	20.2	1:48	14.5
24 SUN	·	3:27	20.1	2:32	13.8
25 Mon	·	4:12	19.8	3:20	13.3
26 Tues	·	4:51	19.6	4:04	12.9
27 Wed	·	5:28	19.2	4:50	12.8
28 Thur	·	6:02	18.9	5:39	12.9
29 Fri	•	6:35	18.6	6:27	13.2
30 Sat	•	7:04	18.2	7:18	12.7
31 SUN	•	7:35	17.8	8:11	14.3

NU-7
• BIGGER THE DOT—BETTER THE FISHING

LOW Tides NUSHAGAK District JULY 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft.	P.M. Time	P.M. Ft.
1 Fri	·	1:03	2.8	2:23	5.1
2 Sat	•	1:48	3.7	3:02	4.3
3 SUN	•	2:37	4.6	3:37	3.3
4 Mon	•	3:27	5.5	4:16	2.2
5 Tues	•	4:20	6.3	4:55	1.1
6 Wed	●	5:15	6.9	5:35	−0.1
7 Thur	●	6:12	7.4	6:17	−1.3
8 Fri	●	7:09	7.6	7:03	−2.3
9 Sat	●	8:06	7.5	7:53	−3.1
10 SUN	●	9:02	7.2	8:44	−3.6
11 Mon	●	9:57	6.5	9:38	−3.8
12 Tues	●	10:53	5.6	10:34	−3.4
13 Wed	●	11:48	4.3	11:33	−2.7
14 Thur	●	—	—	12:41	2.9
15 Fri	●	0:33	−1.4	1:36	1.4
16 Sat	●	1:33	0.1	2:28	0.0
17 SUN	●	2:33	1.7	3:21	−1.1
18 Mon	●	3:36	3.2	4:14	−1.9
19 Tues	•	4:39	4.5	5:04	−2.3
20 Wed	•	5:42	5.5	5:58	−2.3
21 Thur	•	6:42	6.3	6:44	−1.9
22 Fri	•	7:39	6.8	7:32	−1.4
23 Sat	·	8:35	7.1	8:18	−0.8
24 SUN	·	9:29	7.2	9:03	−0.1
25 Mon	·	10:17	7.2	9:46	0.6
26 Tues	·	11:03	7.1	10:28	1.3
27 Wed	·	11:48	6.7	11:10	2.1
28 Thur	·	12:28	6.2	11:55	2.9
29 Fri	•	—	—	1:05	6.5
30 Sat	•	0:38	3.7	1:41	4.7
31 SUN	•	1:22	4.5	2:17	3.3

NU-7
DAYLIGHT TIME

HIGH Tides NUSHAGAK District AUGUST 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft	P.M. Time	P.M. Ft
1 Mon	•	8:10	17.4	9:03	16.5
2 Tues	●	8:46	17.0	9:53	18.7
3 Wed	●	9:21	16.8	10:45	17.9
4 Thur	●	10:03	16.6	11:40	19.0
5 Fri	●	10:49	16.5	—	—
6 Sat	●	0:33	20.1	11:40	16.5
7 SUN	●	1:27	21.0	12:38	16.4
8 Mon	●	2:23	21.7	1:39	16.8
9 Tues	●	3:15	22.2	2:44	17.0
10 Wed	●	4:08	22.4	3:51	17.3
11 Thur	●	4:59	22.3	5:00	17.7
12 Fri	●	5:51	22.0	6:08	18.2
13 Sat	●	6:40	21.4	7:18	18.6
14 SUN	●	7:31	20.6	8:22	19.3
15 Mon	•	8:23	19.6	9:27	19.7
16 Tues	•	9:12	18.6	10:28	20.0
17 Wed	•	10:05	17.6	11:28	20.1
18 Thur	•	10:55	16.6	—	—
19 Fri	·	0:21	19.9	11:46	15.8
20 Sat	·	1:13	19.7	12:34	15.1
21 SUN	·	2:05	19.4	1:23	14.5
22 Mon	·	2:51	19.0	2:08	14.1
23 Tues	·	3:33	18.7	2:57	13.8
24 Wed	·	4:10	18.3	3:45	13.7
25 Thur	•	4:46	17.9	4:33	13.8
26 Fri	•	5:21	17.5	5:20	14.2
27 Sat	•	5:50	17.1	6:10	14.7
28 SUN	•	6:24	16.7	6:57	15.5
29 Mon	●	6:56	16.3	7:48	16.4
30 Tues	●	7:29	16.1	8:34	17.4
31 Wed	●	8:06	16.0	9:24	18.3

NU-8
• BIGGER THE DOT—BETTER THE FISHING

LOW Tides NUSHAGAK District AUGUST 1983

Date Day	Dot's Guide	A.M. Time	A.M. Ft	P.M. Time	P.M. Ft.
1 Mon	•	2:13	5.3	2:54	2.8
2 Tues	●	3:03	6.0	3:32	1.5
3 Wed	●	3:54	6.6	4:14	0.3
4 Thur	●	4:50	7.1	4:57	−0.9
5 Fri	●	5:45	7.3	5:48	−2.0
6 Sat	●	6:41	7.3	6:38	−2.9
7 SUN	●	7:36	7.0	7:28	−3.4
8 Mon	●	8:32	6.3	8:24	−3.5
9 Tues	●	9:28	5.4	9:23	−3.2
10 Wed	●	10:24	4.1	10:22	2.5
11 Thur	●	11:19	2.7	11:21	−1.3
12 Fri	●	—	—	12:12	1.3
13 Sat	●	0:22	0.0	1:07	0.0
14 SUN	•	1:22	1.4	2:01	−1.0
15 Mon	•	2:22	2.7	2:54	−1.7
16 Tues	•	3:25	3.9	3:49	−1.9
17 Wed	•	4:23	4.9	4:38	−1.8
18 Thur	•	5:21	5.6	5:27	−1.4
19 Fri	·	6:18	6.1	6:18	−0.9
20 Sat	·	7:12	6.5	7:04	−0.3
21 SUN	·	8:03	6.8	7:51	0.4
22 Mon	·	8:53	6.8	8:38	1.1
23 Tues	·	9:41	6.7	9:20	1.8
24 Wed	·	10:24	6.4	10:05	2.5
25 Thur	·	11:03	6.0	10:48	3.3
26 Fri	•	11:41	5.4	11:33	4.0
27 Sat	•	—	—	12:20	4.6
28 SUN	•	0:18	4.7	12:55	3.8
29 Mon	●	1:07	5.3	1:32	2.9
30 Tues	●	1:56	5.9	2:11	1.8
31 Wed	●	2:44	6.3	2:52	0.8

NU-8
DAYLIGHT TIME

APPENDIX E. ALASKA BOARD OF FISHERIES REGULATORY ACTION AND MANAGEMENT POLICY CHANGES FOR THE 1983 COMMERCIAL AND SUBSISTENCE FISHING SEASON, BRISTOL BAY.

The Alaska Board of Fisheries adopted or amended the following regulations concerning Bristol Bay:

I. FALL DECEMBER, 1982 BOARD MEETING:

A. SALMON

(1) A proposal to close the commercial salmon fishing season (5 AAC 06.XXX) until subsistence needs are met, was deferred by the Board until the spring (1983) meeting.

(2) Closed water boundaries (5 AAC 06.350) were clarified for the inner boundaries of all districts in Bristol Bay. With some exceptions, these proposed changes did not represent significant revisions to current closed areas, but were aodpted by the Board to make the closures more identifiable and understandable. The only major closed water change was in Nushagak district, where the outer king salmon boundary line was closed to fishing effective with the beginning of the emergency order period at 9:00 a.m. on June 16. Previously fishing was allowed out to the king boundary line through June 21.

(3) The district registration and reregistration procedures (5 AAC 06.370) were amended by the Board to provide a simplified method for initial district registration by combining the initial registration process with the first delivery of fish for the season, utilizing the fish ticket as verification of registration.

B. HERRING

(1) The Board adopted a series of proposals (5 AAC 01.305, 320 and 325) to include herring, herring spawn on kelp, and capelin under existing subsistence regulations. The Board defined areas where subsistence fishing could take place, type and amount of legal gear and those waters closed to herring and capelin subsistence fishing.

(2) The Board adopted a proposal to allow herring to be taken with trawl gear in the Bering Sea only during seasons established by emergency order (5 AAC 27.930).

(3) A proposal to clarify the responsibility of each buyer or his agent when registering with the Department under 5 AAC 27.862 was adopted.

II. SPRING MARCH, 1983 BOARD MEETING:

A. SALMON

(1) A proposal to limit set net fishermen in Nushagak district to fishing sites within 1,000 feet from the 18 foot high tide mark was deferred

APPENDIX E. (continued)

A. SALMON (continued)

until the fall 1983 Board meeting to allow additional time for consideration by those fishermen who would be affected.

The Alaska Board of Fisheries rejected Bristol Bay and statewide proposals that would have affected Bristol Bay at their fall 1982 and spring 1983 meetings dealing with:

(a) reduced gill net fishing gear for Bristol Bay herring fishermen;

(b) establishment of a harvest quota for Bristol Bay herring purse seine and gill net fishermen;

(c) closure of the commercial salmon fishing season in Bristol Bay until subsistence needs were met;

(d) allowing troll gear in all state waters; and

(e) establishement of a statewide herring harvest management plan.

ANNUAL MANAGEMENT REPORT

BRISTOL BAY HERRING FISHERY

1983

INTRODUCTION

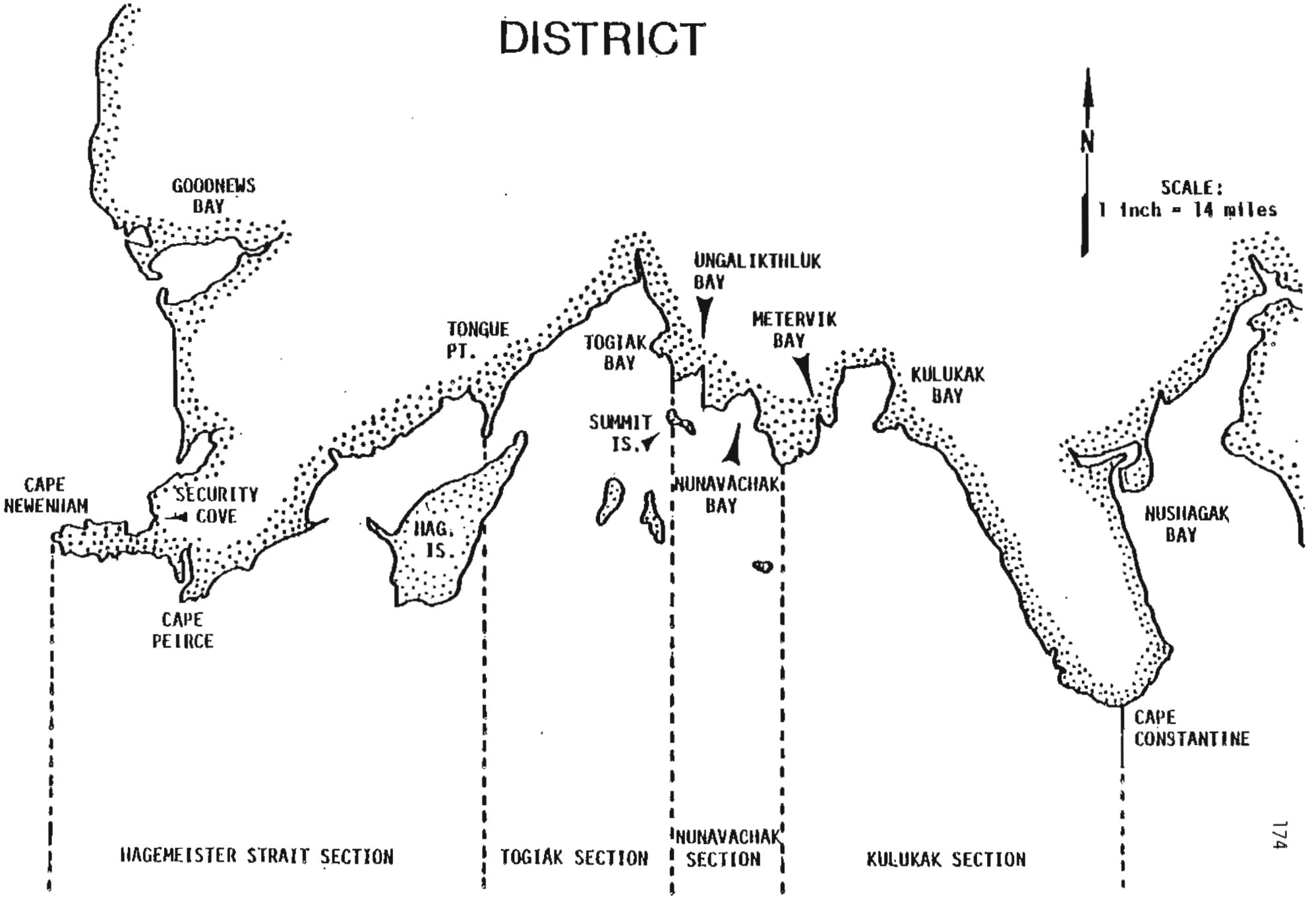
The Bristol Bay sac roe herring fishery began in 1967 and was followed by the spawn on kelp fishery in 1968. For the first 10 years effort levels and the number of processors remained small (Appendix Table 2). Due mainly to economic factors the sac roe fishery did not operate in 1971 and 1976. Favorable market conditions and additional incentives provided by the Fishery Conservation and Management Act of 1976 (the 200 mile limit) gave incentives to the domestic industry, and in 1977 a major expansion of this fishery began.

Herring have been reported in all districts of Bristol Bay, but the major concentration of biomass and the fishery occurs in and around Togiak (Figure 1). Purse seines, hand purse seines and gill nets are the legal types of gear allowed in this fishery, and all three methods are restricted to 150 fathoms per permit holder, however, gill netters may fish a total of 300 fathoms per vessel if two permittees are aboard.

The designated fishing season for herring in Bristol Bay occurs from April 25 through June 30, but the fishery has been managed by emergency order field announcement since 1981. A management policy by the Alaska Board of Fisheries directs the staff to attempt to maximize the roe recovery of the commercial harvest and to minimize wastage. The management policy directive further provides for a threshold level of biomass before the fishery will occur and a target percentage of exploitation for young and old age class herring. The regulatory management plan for the Togiak herring fishery also calls for a gill net fishing time allocation three times longer than that for purse seines for all openings less than 24 hours duration.

Figure 1.

TOGIAK HERRING FISHING DISTRICT



In the event that a capelin fishery should develop, the Board of Fisheries has adopted a formal policy to protect against covert operations on herring.

The spawn on kelp fishery has operated in Togiak on an annual basis since it began in 1968. Development of this fishery increased steadily until it peaked in 1979 with over 400,000 pounds landed (Appendix Table 5). Concerns about possible depletion of the areas flora led to a Board of Fisheries approved management plan in 1979, designed to disperse the harvest and to define the level of desired exploitation by area. Harvest areas are designated by a K-series location map made available to the fishermen prior to the season (Figure 2). The 1979 spawn on kelp management plan remains in effect and was the basis for the management of this fishery in 1983.

Herring Sac Roe Fishery

The commercial herring fishery at Togiak has been regulated by emergency order since 1981 to eliminate wastage problems and achieve exploitation rate objectives. Due to an early ice breakup in 1983, the fleet was able to travel to the fishing grounds without difficulty this season. As early as March 30, virtually no ice was visible near the coastline and large transport vessels were reported near Round Island on April 14. This was in sharp contrast to 1982, when 50 miles of ice was reported offshore as late as May 5, the first day that Department camps were established on the fishing grounds.

The first herring aerial biomass survey was conducted on April 26, when 15,600 short tons were estimated to be present, compared to 1982 when the first herring were sighted on May 12 and the biomass estimated at 200 s. tons (Table 1). On April 22, all three Department field camps were operational and gill net test fishing was initiated. The first test fishing samples were obtained on

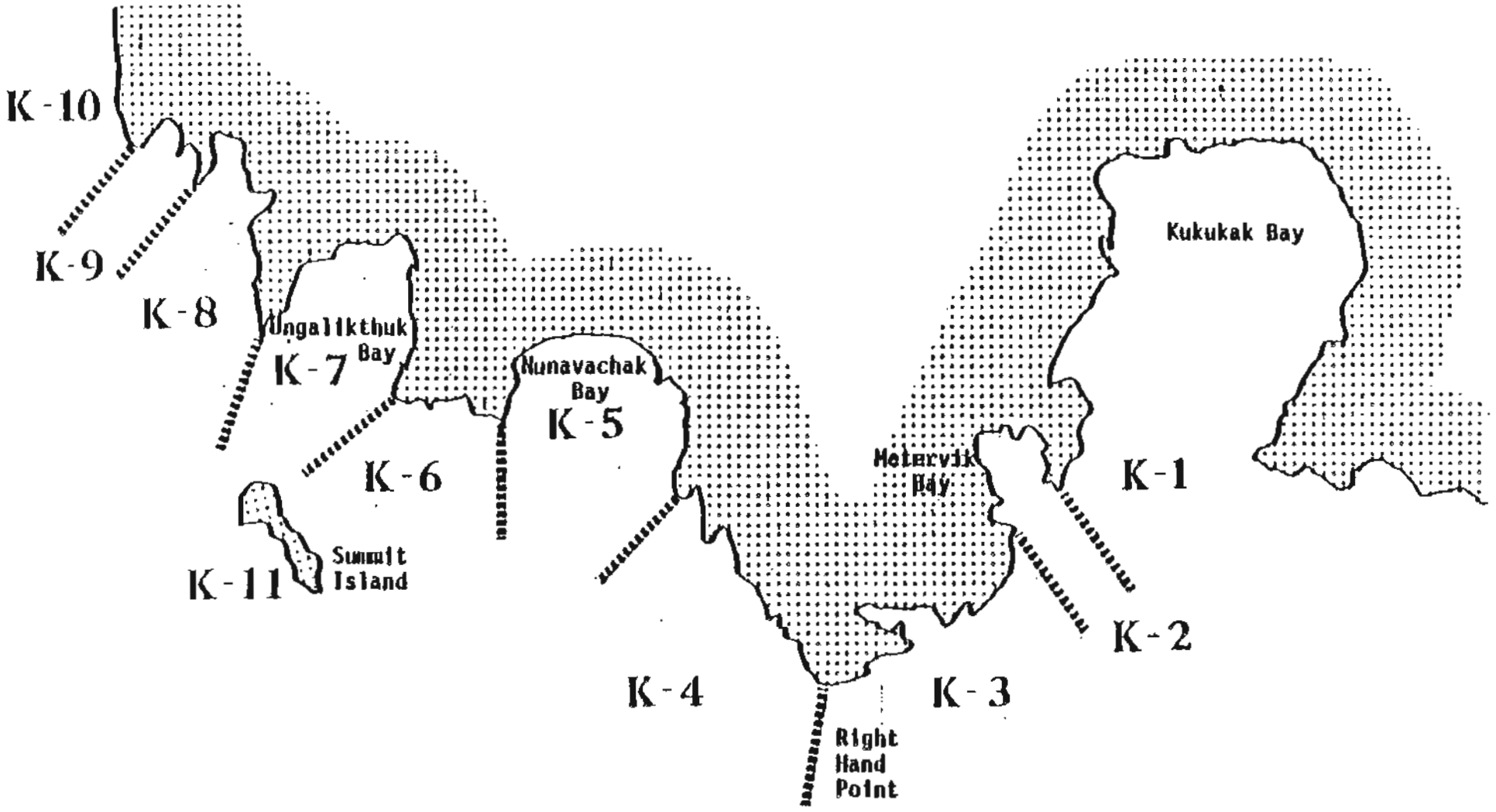


Figure 2.

HERRING SPAWN-ON-KELP MANAGEMENT AREAS (K-1 THROUGH K-11)

April 26 and these fish proved to be large old herring that were several days from maturity. Bad weather hampered aerial surveys for the next several days but the biomass was obviously building in those areas where fish were visible. On April 28 the first significant samples were obtained from purse seine sampling in Togiak Bay. An intensive test fishing program was again conducted this season using methods similar to those described in the 1982 Annual Management Report. Five and six year old herring dominated the samples and these fish were estimated to be 5 to 7 days from spawning.

On May 1-2 both gill net and purse seine vessels collected herring from several areas of the district and these samples were publicly tested on the beach at Summit Island for roe maturity. By May 2 spawning was observed in numerous areas and continued roe testing indicated that the majority of the fish were rapidly approaching sexual maturity (Table 1).

The first fishing period of 1983 was announced for the morning of May 3 (Table 2). Several companies were still on route and arrived just in time to participate in the opening. The harvest for the May 3 fishing period totaled 5,500 s. tons, and many companies reportedly released green herring that were "not quite ripe yet" (Table 3). The largest percentage of herring landed from the May 3 opening, came from Togiak section where roe recovery was the highest. Overall, roe recoveries ranged from 6.5% to 9.0% with the average about 7.8% (Table 3). Approximately 30 gill nets were observed fishing after the closure in the Rocky Point area and Fish and Wildlife Protection officers issued several citations. Several abandoned nets were later recovered by vessels on contract to the Department of Public Safety, but due to their lack of identifying markings and poor condition, these nets were destroyed on Summit Island.

With an estimated biomass of 59,000 s. tons on April 30, the exploitation rate after the first fishing period was approximately 9.3% (Table 1). The Alaska Board of Fisheries management directive for the Togiak herring resource allows for a 10 to 20% exploitation of the observed biomass. During the afternoon aerial survey on May 3, a total of 23 different spawns were observed in all areas of the district (Table 1). With a harvestable surplus of herring still present on the grounds, and strong indications that spawning was at peak, a second fishing period was announced for the morning of May 4 (Table 2). By the evening of May 3, 20 companies were registered to purchase herring and the majority of the fleet was present on the fishing grounds. Good weather was holding at this date, but was forecast to deteriorate within the next two days with possible gale force winds expected.

During the fishing period on May 4, several purse seine vessels reportedly set early and others after the closure. Gear conflicts were also reported in the area north of Summit Island by several gill net vessels whose nets were disturbed by purse seine sets and tenders moving near shore to pump fish. The second fishing period resulted in a harvest of 8,800 s. tons, and roe recoveries were reportedly improved from the previous day, averaging almost 9% (Table 3). An aerial survey on the afternoon of May 4 indicated an increase in herring biomass to 73,600 s. tons (Table 1). The harvest was estimated at over 14,000 s. tons of herring through the second fishing period and the accumulative total tonnage accounted for was approaching 90,000 s. tons. By the afternoon of May 4, the exploitation rate was estimated at approximately 16%, still under the maximum allowable harvest stated in the Board of Fisheries management directive. The weather appeared that it would hold for at least one more day, and the herring were at peak roe maturity. Due to the limited harvestable surplus of herring remaining (about 2,000 s. tons), a shortened fishing period was announced for May 5 (Table 2).

Fishing success appeared to be lighter for the May 5 period and some processors were at or near processing capacity capabilities. Biomass surveys on May 5 confirmed that herring were starting to exit the district, with long bands observed moving east along the Nushagak Peninsula, the normal migration pattern for spawn outs.

The herring harvest for the May 5 period totaled 7,600 s. tons, bringing the accumulative harvest to 22,000 s. tons (Table 3). Aerial surveys on May 8 showed a significant increase in herring biomass, and many large schools were sighted on the seaward side of Hagemeister Island moving toward Togiak Bay (Table 1). Three test boats were deployed in the late evening of May 8 to sample these apparent "new fish", and the fleet was put on notice for a possible opening the morning of May 9. The samples eventually proved to be immature (green) fish which were several days away from maturity. During the evening of May 8 the wind began to pick up and the resulting gale lasted through May 10. On May 11 the storm had moderated and three test boats were again deployed to check roe maturity. Large schools were located on the northwestern side of Togiak Bay, and samples from this area proved to be mostly mature herring with a mixture of some spawn outs. An opening was planned for May 12, but on the afternoon of May 11, a gale warning was issued for area 6A, the north portion of Bristol Bay. At 4:40 p.m. on May 11, a general announcement to the fleet advised all vessels to "head to deep water" pending a possible opening, as there was concern that many fishing boats were going to go dry on the tide. At 5:00 p.m. a fishery opening was announced for 7:00 p.m. the same day (Table 2). The short notice announcement was necessary due to the potential loss of marketable herring due to the pending storm. This final opening resulted in a harvest of 5,000 s. tons, which brought the accumulative herring harvest up to 27,000 s. tons (Table 3). Even with the advance notice of the

opening, as many as 50 vessels may have missed a portion of this opening because they had gone dry on the previous high tide.

For the next several days bad weather restricted aerial surveys and after May 12, no major changes were noted in the biomass or herring age composition to indicate a buildup of new fish moving into the area (Table 1).

The four commercial herring openings this season resulted in a harvest of 27,000 s. tons (24,500 metric tons) and a removal of approximately 19.1% of the estimated total biomass (Table 3 and Appendix Table 3). Preliminary analysis of the harvest by section was: Kulukak - 10%, Nunavachak - 9%, Togiak - 44%, Hagemeister - 36% and 1% unknown.

The 1983 Togiak herring harvest was the largest in the State and in the history of this fishery, breaking the previous record set in 1982 by over 5,000 s. tons (Appendix Table 2). In addition to the reported harvest, an estimated 600 s. tons were lost, mainly due to accidents in the fishery and abandoned gear.

An estimated 250 gill net vessels participated in the fishery, and during the 42 hours of fishing time allowed, landed just over 5,000 s. tons, approximately 19% of the total harvest (Table 3). The purse seine fleet of 150 vessels landed 22,000 s. tons, or about 81% of the total in 14 hours of fishing time allowed this gear group (Table 3). The overall roe recovery for 1983 was estimated at 8.9% for both gear types combined, similar to 1982 (Appendix Table 3). A total of 23 companies participated this year which was 10 less than 1982, but the daily production capacity was approximately the same (Table 6). The price paid fishermen averaged $400 per short ton for 10% herring, and 97% of the total harvest was sold as sac roe, with the remaining fish sold as food or bait at $75 per short ton (Appendix Table 2). The total value of the 1983 herring sac roe fishery was estimated to be in excess of $10.5 million (Appendix Table 7).

Preseason interest was again expressed in the development of a capelin fishery, however, only one operator took one delivery of approximately 40 s. tons in 1983.

Management activities were again assisted this season by a helicopter stationed ongrounds during the fishery. This valuable tool allowed the staff excellent mobility to monitor both the resource and the fleet and was critical to the successful management of the fishery. No Department support vessel was available this season, so a new field camp was established behind Tongue Point to monitor the fishery in this outlying area, transmit catch data and sample both test fish and commercial catch samples.

Herring Spawn on Kelp Fishery

In 1983 the Togiak herring spawn on kelp (Fucus sp.) fishery was again managed under a policy approved by the Board of Fisheries in 1979 and the same K-areas and management criteria that were used as described in the 1982 Annual Management Report (Figure 2). Spawn on kelp harvests were regulated by emergency order, and three commercial openings were allowed in 1983 during May 5-7, resulting in a harvest of 271,000 pounds (Table 4). By May 8 a limited amount of surplus spawn on kelp was still available for potential harvest, but a storm developed and concern about sand and silt pollution and potential waste due to an unsalable product precluded any further commercial exploitation. By this time many of the early spawns were nearly eyed-up, also rendering them unsalable.

Spawning was observed from May 2 until early June, and a total of 189 spawn (milt) sighting were reported on the fixed wing aerial surveys, encompassing 59.7 linear miles of beach, considerably more than the excellent spawn observed in 1982 (Appendix Table 6). In addition to the spawn on kelp

near shore, several sub-tidal spawns were observed in Metervik and Ungalikthluk Bays, on the west side of Hagemeister Island and near Asigyukpak Spit. Low level aerial mapping of the visible spawn on kelp was conducted using the helicopter and this method provided a more quantifiable record of the actual egg deposition. Egg density (layers) are estimated by color from the air and are verified by actually on-grounds sampling. The 1983 season showed a record number of licensed kelp permit holders (489), however, only 125 fishermen were observed actually participating in the kelp harvest.

Four commercial processors purchased herring spawn on kelp in 1983 at an average price of $1.05 per pound and the estimated exvessel value of this fishery was $284,000 (Appendix Table 7). The fishing power of the participants was ably demonstrated this season when 125,000 pounds of spawn on kelp were harvested in a 24-hour opening, under poor conditions and with a five foot holdover tide (Table 4).

Division of Subsistence personnel closely monitored the harvest of spawn on kelp for personal use in 1983, and estimated that removal for personal use to be less than 12,000 pounds.

Recent information provided by the University of Alaska after completion of their contractual studies on the aquatic flora resources in the Togiak area aided the staff in the development of a new management plan for the spawn on kelp fishery. The new kelp management plan calls for a rotational harvest and a target level of exploitation, and will be in effect for the 1984 season.

Aerial Biomass Surveys

A total of 30 fixed wing aerial surveys were flown on 27 days in 1983 from April 26 through June 3 (Table 1). About half of these surveys were flown under fair to excellent conditions, and the same survey methods were

employed as described in the 1982 Annual Management Report. A total of 90.6 hours were logged with fixed wing aircraft and additional surveys were flown with the helicopter for verification of fishing effort, spawn deposition and school tonnage (point) estimates from purse seine test boat catches.

In 1983 the staff again logged reported observations by commercial industry spotter pilots. This information proved to be helpful in locating herring school concentrations and for comparison with Department biomass estimates. In almost all instances there was a close correlation between the staff observations and those of the industry. The extra industry observers also saved search time and allowed the staff to focus on reported concentrations of fish.

Conversion factors used in calculating the formula herring biomass estimates in 1983 were: 1.3 s. tons for shallow water areas (15 feet or less), 2.4 s. tons for intermediate depths (16 to 24 feet), and 3.4 s. tons for an average of all point estimates. These slight changes from previous year conversion estimates were based on the most recent data from continued point estimate sampling.

During the season herring biomass was estimated to be approximately 140,000 s. tons, while analysis of data from test fishing and contracted commercial vessels resulted in a post-season herring biomass of 142,000 s. tons, less than 2% difference.

Age Composition

Age-weight-lenght (AWL) samples were collected throughout the season from variable mesh gill nets, contracted purse seine and gill net vessels and from the commercial harvest. Approximately 80% of the total biomass was composed of age 5 and 6 year old herring (1978 and 1977 year classes), while age 4

herring (1979 year class) accounted for only 4% of the biomass (Figure 3). Although the relative proportion of young, newly recruited herring (age 4 and less) increased as the season progressed, it was not possible to identify separate abundance peaks for young and old (age 5 and greater) herring as had been documented during the 1979-81 seasons. Therefore, the management strategy of differential exploitation rates based on age at return, as dictated in the Board of Fisheries management directive, could not be carried out this season.

Enforcement

The Fish and Wildlife Protection Division was well represented at Togiak this season with the patrol vessels Woldstad, Vigilant, Compliance and Public Safety I present on the fishing grounds, which greatly enhanced efforts to enforce regulations. The most common violations were gill nets fishing after closures and purse seine vessels making sets prior to and after openings.

Several citations were issued during the season for these offenses, but it was difficult to effectively prosecute them due to the "Reynolds decision" regarding intent, and the absence of a definition in the regulations when a purse seine has ceased fishing. Both of these issues have been addressed by the Board of Fisheries and should not pose additional problems in 1984. Several abandoned strings of gill nets were recovered by two commercial fishing vessels on contract to Public Safety. The program to recover abandoned gill nets was effective and well received, and will be continued in the future if abandoned nets continue to be a problem in this fishery.

Numerous minor oil spills and large volumes of trash continued to be a major enforcement problem at Togiak. Personnel from the Department of Environmental Conservation and the U. S. Coast Guard were again stationed on the fishing grounds this season, but with limited visible effect. An aggressive

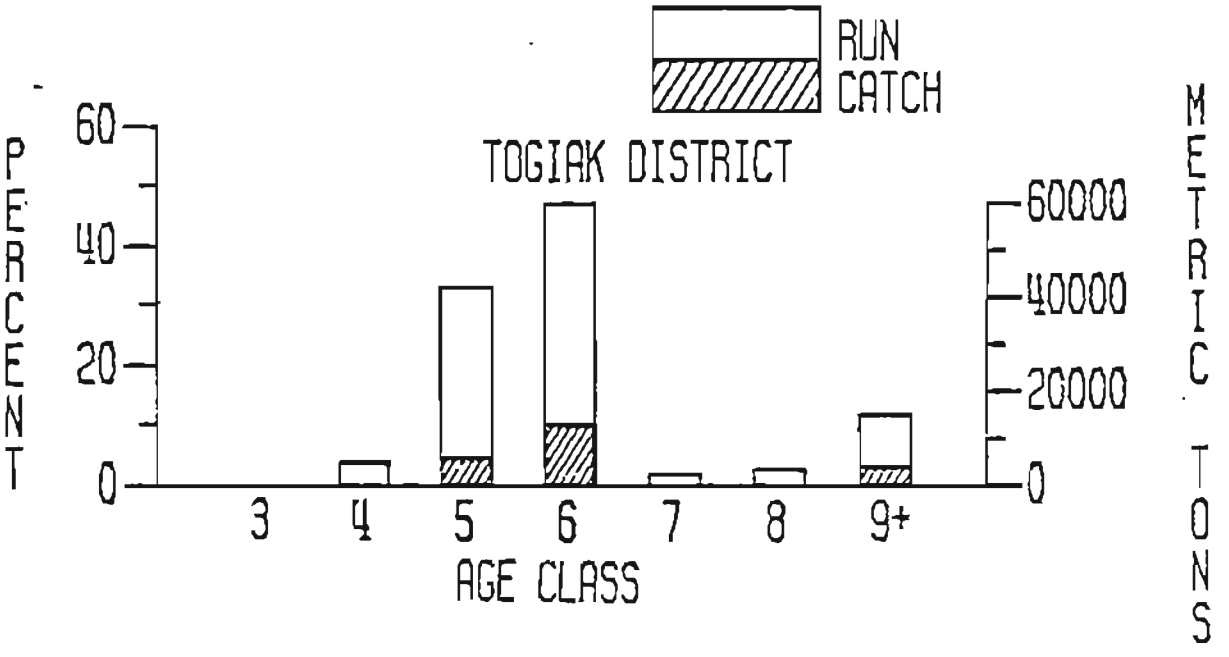


Figure 3. Age class composition of the total spawning run and commercial harvest of Pacific herring in Togiak District, Bristol Bay, Alaska, 1983.

program needs to be initiated to deal with these problems before there is a serious negative impact on the local environment.

Outlook and Management Strategy for 1984

Based on the strong return of age 5 and 6-year old herring in 1983 and with a "normal" overwinter mortality, it is probable that a large harvestable surplus will again be available in 1984. Recruitment into the fishery is always a significant variable, but the 4-year old herring in 1984 will be the progeny from the 1980 spawn when the biomass appeared to be significantly decreased. Also, a major storm in 1980 may have taken a heavy toll on the spawn that was deposited. The weakness of the 1980 brood year appears to be borne out by the total absence of 3-year old herring in the 1983 samples.

Several new regulations enacted by the Board of Fisheries will be in effect for 1984, including: separate fishing time for gill nets and purse seines when possible; openings at, or near low water; gill nets are to be allowed to fish first when possible; and, when purse seine openings are one hour or less, gill net openings shall be at least five hours in duration. The Board clearly expressed that it was their intent that the available harvest would be taken by the inshore fishery. A strict liability regulation was also adopted, which now makes all fishermen responsible for their actions regardless of their intent, and a new regulation defining when a purse seine has ceased fishing was also adopted by the Board for 1984.

Continued interest has been expressed in the development of a Togiak capelin fishery, and at this time at least two processors are planning a major freezing operation in 1984. Unless an obvious resource conservation problem develops, it is likely that this fishery will be conducted with as few restrictions as possible to encourage participation in this new and developing fishery.

TABLES

Table 1. Summary of herring aerial survey total run biomass estimates and observations of herring spawn, Togiak district, Bristol Bay, 1983.

Date	Survey Rating[1]	Census Area Surveyed[2]	Number Herring Schools Observed				Herring Biomass Est.[3][4]		Herring Spawn		
			Small	Medium	Large	Total	Formula	Staff	No.	Miles Each	Miles Accum.
4/26	G	NUS2-OSV1		325	98	423	15,600	13,800			
27	P	NUS2-TON1		10	268	278	11,500	20-25,000			
29	G/F	NUS2-HAG1		139	293	432	62,500	50,000			
30	G	NUS2-HAG1	12	426	263	701	59,000	53,700			
5/ 2	P/U	NUS2-MAT1		176	10	186		80,000	10	3.6	3.6
3(AM)	F/U	NUS2-OSV1		-Fleet Survey-					7	2.5	6.1
3(PM)	F/P	NUS2-OSV1		239	102	341	14,100	15,500	23	6.8	12.9
4(AM)	P/U	NUS2-UNG1			1	1	150		8	3.3	16.2
4(PM)	G/U	NUS2-OSV1		272	340	612	73,600	70,700	32	9.2	25.4
5(AM)	G/F	NUS2-OSV1		225	228	453	22,500	18,100	19	5.3	30.7
5(PM)	G/U	NUS1-OSV1		394	317	711	38,500	32,200	8	2.2	32.9
6	F/G	NUS1-PYR1	53	292	263	608	37,900	34,400	8	2.9	35.8
7	G/E	NUS2-HAG1	17	421	297	735	52,100	47,300	8	1.5	37.3
8	G/E	NUS1-HAG1	9	940	650	1,599	91,600	96,500	8	1.9	39.2
11	P/U	NUS2-HAG1		38	46	84	41,000	33,600	3	3.5	42.7
12	G/P	NUS1-HAG1		161	357	518	84,100	76,300	9	5.4	48.1
13	P/U	NUS1-TOG1		10	15	25	800	500			48.1
15	F/U	NUS2-HAG1		58	89	147	37,900	34,300	2	1.0	49.1
16	F/P	NUS2-HAG1	17	194	162	373	76,200	89,600	4	0.5	49.6
17	G/F	NUS1-HAG1	18	421	219	658	83,800	88,100	9	2.0	51.6
18	G/E	NUS1-CN1		365	236	601	114,200	105,100	19	6.1	57.7
19	G/F	NUS1-PYR1		110	210	320	-70,700-		7	1.7	59.4
20	P/U	NUS2-TON1		49	5	54	400	450			59.4
23	P/U	NUS2-OSV1			1	1	500	6,000			59.4
25	U	KUL1-TOG1			2	2		2,000	1	0.1	59.5
26	G/E	NUS2-PYR1	2	152	65	219	39,200	36,200	1	0.1	59.6
27	E	NUS2-PYR1	3	42	65	110	40,800	40,400	2	0.1	59.7
30	P/U	NUS2-TOG1			1	1	+				59.7
6/ 1	G/P	NUS2-OSV1			4	4	180	200			59.7
3	G/F	NUS2-OSV1		26	9	35	1,200		1	+	59.7

1/ Survey rating: U = unacceptable; P = poor; F = fair; G = good; and E = excellent.
2/ Inclusive census areas: NUS 1 and NUS2 = Nushagak Peninsula; KUL1 = Kulukak; MET1 = Metervik; NUN1 = Nunavachak; UNG1 = Ungalikthluk; TOG1 = Togiak; TON1 = Tongue Point; MAT1 = Matogak; OSV1 = Osviak; HAG1 = Hagemeister; PYR1 = Pyrite Point; and CN1 = Cape Newenham.
3/ Short tons.
4/ Formula: Total RAI's x conversion factors of 1.3, 2.4, and 3.4 tons, by census area and fish density/distribution;
Staff: Personal estimates by experienced Department spotters.

Table 2. Emergency order commercial herring sac roe and herring spawn on kelp fishing periods, Togiak district, Bristol Bay, 1983.

Emergency Orders[1/] Number	K Area	Date, Time and Gear	Hours/Days Open
I. HERRING SAC ROE			
DLG 01		May 3 6 a.m. - May 3 6 p.m. Gill Net	12 hours
		May 3 6 a.m. - May 3 10 a.m. Purse Seine	4 hours
DLG 02		May 4 7 a.m. - May 4 7 p.m. Gill Net	12 hours
		May 4 7 a.m. - May 4 11 a.m. Purse Seine	4 hours
DLG 03		May 5 8 a.m. - May 5 5 p.m. Gill Net	9 hours
		May 5 8 a.m. - May 5 11 a.m. Purse Seine	3 hours
DLG 07		May 11 7 p.m. - May 12 4 a.m. Gill Net	9 hours
		May 11 7 p.m. - May 11 10 p.m. Purse Seine	3 hours
II. HERRING SPAWN ON KELP			
DLG 04	K3-9	May 5 9 a.m. - May 6 9 a.m.	24 hours
DLG 05	K3-7	May 6 1 p.m. - May 7 10 a.m.	21 hours
DLG 06	K4-7	May 7 2 p.m. - May 7 9 p.m.	7 hours

1/ Prefix code on emergency orders indicate where announcements originated ("DLG" for Dillingham).

Table 3. Inshore commercial herring catch and roe recovery by period and gear type, Togiak district, Bristol Bay, 1983.

Period	Time GN/PS	Short Tons Gill Net	Short Tons Purse Seine	Short Tons Total	Roe Percent Gill Net	Roe Percent Purse Seine	Roe Percent Total 1/	Metric Tons
5/ 3	12/4 hrs	1,584	3,950	5,534	6.46	8.38	7.83	5,020
4	12/4 hrs.	1,687	7,145	8,832	7.25	9.30	8.91	8,011
5	9/3 hrs.	1,040	6,597	7,637	6.99	9.99	9.58	6,927
11	9/3 hrs.	714	4,279	4,993	7.17	9.41	9.09	4,529
Total	42/14 hrs.	5,025	21,971	26,996	6.94	9.36	8.91	24,486
Percent of Catch		18.6	81.4	100.0				

1/ Weighted by catch and gear type.

Table 4. Commercial herring spawn on kelp harvest by day and area, Togiak district, Bristol Bay, 1983.

Date	Harvest in Pounds by Beach Kelp Area							Daily	
	K-3	K-4	K-5	K-6	K-7	K-8	K-9	Pounds	Metric Tons
5/5-6					2,320	102,044	20,566	124,930	57
6-7	69,891	4,435	3,106		14,300			91,732	42
7		21,419			32,785			54,204	25
Total	69,891	25,854	3,106		49,405	102,044	20,566	270,866	123
Season Quota	45,000	49,000	46,000	56,000	64,000	49,000	36,000	345,000	156

Table 5. Herring total run biomass and inshore commercial catch by year class, Togiak district, Bristol Bay, 1983.

Year Class	Age	Total Run and Catch by Year Class: Total Run Metric Tons	Total Run Percent	Catch Metric Tons	Catch Percent	Escapement in Metric Tons
1974+	9+	15,038	12	3,760	15	11,278
75	8	3,362	2	671	3	2,691
76	7	2,463	2	670	3	1,793
77	6	60,346	47	12,915	53	47,431
78	5	42,269	33	6,247	25	36,022
79	4	5,076	4	219	1	4,857
80	3	46	+	4	+	42
Total		128,600	100	24,486	100	104,114

Table 6. Commercial herring sac roe and herring spawn on kelp processors and buyers operating in the Togiak district, Bristol Bay, 1983. 1/

Name of Operator/Buyer	Base of Operations	Processing Method: Frozen	Processing Method: Cured	Brine Export	Comments
A. HERRING SAC ROE					
1. A. Kemp Fisheries	M/V Bering Trader	Floater			
2. Ak. Herring Corp.	M/V Hatsue Maru #68	Floater			Joint venture w/U.S. gill netters.
3. All Alaskan Seafoods	M/V All Alaskan	Floater			
4. Comeau Int'l. Sales	M/V Clipperton	Floater			
5. Consolidated Sea Prod.				Sea	Tendered to Dutch Harbor for freezing
6. Dragnet Fisheries	M/V Alaskan I	Floater			Cons. w/Alaskan I.
7. Dutch Harbor Seafoods	M/V Galaxy	Floater			
8. Icicle Seafoods	P/V Arctic Star	Floater			
9. Kodiak King Crab	M/V Shelikof Strait			Sea	Tendered to Naknek for freezing and Kodiak for freezing and stripping.
10. Lafayette, Inc.	M/V Pribilof	Floater			
11. Newby Co.	M/V Grampas		Floater		
12. New West Fisheries	M/V Golden Dawn			Sea	Tendered to Pt. Moller, King Cove & Dutch Harbor for freezing.
13. Nuka Pt. Fisheries	P/V Marin I		Floater		Custom stripped only.
14. Pelican Cold Storage	M/V Coastal Glacier			Sea	Tendered to Sand Pt. for freezing.
15. Polar Ice Seafoods	M/V Polar Ice	Floater			Cons. w/Northcoast.
16. Sea Alaska Products	M/V Pacific Pride	Floater			
17. Sea Ventures	M/V Lady Patricia	Floater			
18. Seward Marine Services	M/V Trident	Floater		Sea	Stripped at Seward.
19. Sterling Seafoods	M/V Alaska Star	Floater			
20. TNP Joint Operation	Togiak Fisheries	Shore			Frozen at Togiak, Ekuk & Peterson Pt.
21. Togiak Fisheries	Togiak Fisheries	Shore			Small operation separate from TNP Co-op.
22. Trident Seafoods		Floater		Sea	Tender to Dutch Harbor for freezing
23. Whitney-Fidalgo Seafoods	M/V Yardarm Knot	Floater		Sea	Tender to Pt. Graham.
	Total Togiak District	17	2	7	
B. HERRING SPAWN ON KELP					
1. Icicle Seafoods	M/V Ocean Dawn		Floater		
2. Northcoast Seafoods	M/V Polar Bear		Floater		
3. Nuka Pt. Fisheries	P/V Marin I		Floater		
4. Sterling Seafoods	M/V Alaska Star		Floater		
	Total Togiak District	0	4	0	

1/ Indicates operators with either a physical plant or processing facility in a district or those operators from other areas buying herring or kelp and for providing tender and support service for fishermen in areas away from the facility.

APPENDIX TABLES

Appendix Table 1. Surface area and biomass conversion estimates of herring schools, by aerial survey, in the Togiak district, Bristol Bay, 1978-83.

Year	Month/ Day	Est. of Tons Per 50m sq. m. 1/	School Size in Feet	Weight of Catch in Metric Tons	Actual or Est. Weight of Catch	Fish Condition	Location of Purse Seine Set	Water Depth in Feet
1978	5/13	6.7	2/	2/	Estimated	2/	Nunavachak Bay	2/
	18	11.0	80 x 60	100	Estimated	2/	Nunavachak Bay	2/
1979	5/ 4	2.4	40 dia.	5	Actual	Ripe	Ungalikthluk Bay	20
1980	5/15	1.2	60 x 40	5	Actual	Ripe	Ungalikthluk Bay	10
	15	1.6	40 x 30	4	Estimated	Spawn-outs	Ungalikthluk Bay	25
	16	1.1 3/	220 x 50	19	Actual	Spawn-outs	Nunavachak Bay	15
	16	1.2	65 x 20	3	Estimated	Fish lost	1 Mile West Ungalikthluk Pt.	16
	20	3.0	70 x 70	27	Estimated	Ripe	East of Eagle Bay	20
	20	2.6	150 x 75	54	Estimated	Fish lost	Eagle Bay	20
1981	5/ 3	1.1	400 x 200	80	Actual	Ripe	West Side, Tongue Pt.	7
	8	1.7	80 x 30	7	Actual	Spawn-outs	Togiak Bay, Mouth	18
	10	4.0	150 x 60	40	Actual	Ripe	Asigyukpak Spit Bight	25
1982	5/15	1.9	200 x 150	100	Estimated	Green	Kulukak Bay	24
1983	4/30	1.1	150 x 80	55	Estimated	Green	Togiak Bay	13
	30	1.0	350 x 143	91	Estimated	Green	Togiak Bay	10
	30	1.5	60 x 30	3	Estimated	Green	Togiak Bay	25
	5/11	1.8	200 x 200	127	Estimated	Ripe and Spawn-outs	Togiak Bay	11
	18	1.7	300 x 50	45	Estimated	Spawn-outs	Nushagak Peninsula	12
	18	2.2	60 x 60	14	Estimated	Spawn-outs	Nushagak Peninsula	14
		2.6	Mean All Estimates					
		1.4	Mean Estimates at 7-16 ft. Water Depth					
		2.3	Mean Estimates at 20-26 ft. Water Depth					

1/ Metric tons of fish per 50 sq. m. of surface area.
2/ Incomplete data.
3/ Average of 2 observers estimates.

(Literature Cited: 1)

Appendix Table 2. Inshore commercial catch of herring by gear type and product, Togiak district, Bristol Bay, 1967-83.

Year	Numbers of Processors	Units of Gear 1/		Percent Catch by Gear and Product Type				Total Catch in Metric Tons 2/
				Gear		Product		
		Gill Net	Purse Seine	Gill Net	Purse Seine	Sac Roe	Food/Bait	
1967	1	27		100		100		122
68	2	35	2	75	25	100		82
69	2	22	1	38	62	100		43
70	3	16	1	67	33	100		25
71 3/								
1972	1	18	1	40	60	100		73
73	2	26	1	100		100		46
74	3	10	1	16	84	100		112
75	2	39		100		100		51
76 3/								
1977	6	43	6	11	89	100		2,534 4/
78	16	40	25	8	92	100		7,030 4/
79	33	350	175	40	60	92	8	10,115 4/
80	27	363	140	16	84	85	15	17,774 4/
81	28	106	83	18	82	99	1	11,372 4/
1982	33	200	135	31	69	93	7	19,556 4/
83	23	250	150	19	81	97	3	24,486 4/
15 Year Total	182	1,545	721					93,421
1967-76 Total	16	193	7					554
1977-83 Total	166	1,352	714					92,867
15 Year Average	12	103	55	22	78	94	6	6,228
1967-76 Average	2	24	1	65	35	100		69
1977-83 Average	24	193	102	22	78	94	6	13,267

1/ Number of units derived from fish tickets until 1979-83, when they were estimated by aerial survey.
2/ Catch not comparable, as harvest prior to 1973 reflects females only; most males were discarded and not weighed.
3/ Fishery not conducted.
4/ Preliminary.

(Literature Cited: 1)

Appendix Table 3. Estimated total run biomass and inshore commercial catch of herring, Togiak district, Bristol Bay, 1978-83.

		Total Run Biomass and Catch in Metric Tons					
				Percent			
				Roe Recovery			
Year	RAI 1/	Run	Harvest	Gill Net	Purse Seine	Total	Run Harvested
1978	43,050	172,600	7,030			8.2	4.1
79	137,630	216,800	10,115			8.6	4.7
80	15,249	62,300	17,774 2/			9.2	28.5 2/
81	79,352	143,900	11,372	6.7	10.1	9.1	7.9
82	49,998	88,800	19,556	7.4	9.5	8.8	22.0
83	88,806	128,600	24,486	6.9	9.3	8.9	19.1

1/ R.A.I. = relative abundance indices; number of fish schools equivalent to 50 sq. m. surface area, unadjusted for presence of non-herring pelagic schools.
2/ Does not include an estimated 5,200 metric tons of waste.

(Literature Cited: 1)

Appendix Table 4. Age composition of the inshore herring run, Togiak district, Bristol Bay, 1977-83.

	Age Composition in Percent 1/						
Age	1977	1978	1979	1980	1981	1982	1983
3	4	11 2/	3	3	2		+
4	49	44	9	2	48	16	4
5	37	33	43	2	5	56	33
6	3	9	35	39	1	3	47
7	3	1	9	37	25	1	2
8	3	1	+	15	15	13	2
9+	1	1	1	2	4	11	12
Catch (m.t.)	2,535	7,030	10,115	17,774	11,372	19,556	24,486
Run (m.t.) 3/		172,600	216,800	62,300	143,900	88,800	128,600

1/ Age composition in 1977-78 based on number sampled, and not weighted by weight at age and aerial biomass estimates; while age composition in 1979-83 is weighted by weight at age and aerial biomass estimates.
2/ Includes age 1, 2 and 3.
3/ Estimate of total run, including commercial catch.

(Literature Cited: 1)

Appendix Table 5. Commercial harvest of herring spawn on kelp in the Togiak district, Bristol Bay, 1968-83.

Year	Number of Processors	Number		Harvest	
		Fishermen	Deliveries	Pounds	Metric Tons
1968	1	1	6	54,600	25
69	1	3	20	10,125	5
70	1	5	23	38,855	18
71	1	12	43	51,795	23
72	1	12	32	64,165	29
1973	1	10	11	11,596	5
74	3	26	49	125,646	57
75	2	44	98	111,087	50
76	5	49	118	295,780	134
77	5	75	266	275,774	125
1978	11	160	349	329,858	150
79	16	100	228	414,727	188
80	21	78	186	189,662	86
81	7	108	277	378,207	172
82	8	214	167	234,924	107
1983	4	125	257	270,866	123
16 Year Total	88	1,022	2,130	2,857,667	1,297
1968-77 Total	21	237	666	1,039,423	471
1978-83 Total	67	785	1,464	1,818,244	826
16 Year Average	6	64	133	178,604	81
1968-77 Average	2	24	67	103,942	47
1978-83 Average	11	131	244	303,041	138

(Literature Cited: 1)

Appendix Table 6. Aerial observations of herring spawnings in the Togiak district, Bristol Bay, 1978-83. 1/

	1978		1979		1980		1981		1982		1983	
Date	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles
4/30			2	2.5			9	3.0			0	
5/ 1	1	0.4					6	2.3			0	
2			21	8.3	11	4.0	12	1.9			10	3.6
3	1	0.4	14	5.0	8	3.0	12	6.8			30	9.3
4			8	3.1			4	2.9			40	12.5
5			1	1.3	0		6	2.5			27	7.5
6					3	0.9	0				8	2.9
7			3	0.6	3	1.2	2	0.4	0		8	1.5
8	2	1.8			1	0.2	3	1.0			8	1.9
9			2	0.4			5	1.4				
10			0				0		0			
11	9	7.7			0						3	3.5
12	3	1.5	0		0		15	4.8	0		9	5.4
13	12	8.6			0		6	3.8	0		0	
14	11	5.6	0		2	2.3	10	4.7	0			
15					6	4.0	2	1.5	0		2	1.0
16			0		4	1.2	0		1	0.1	4	0.5
17			0						4	0.7	9	2.0
18	11	4.2							29	7.3	19	6.1
19	3	2.5			1	0.3			16	5.2	7	1.7
20					4	0.9			19	14.0	0	
21			0						3	2.0		
22					2	0.5			3	1.5		
23							10	2.1	11	3.3	0	
24									5	1.4		
25	8	4.2							1	0.3	1	0.1
26	2	2.2	1	0.7			3	0.2	0		1	0.1
27					3	0.3			0		2	0.1
28	0								0			
29					8	1.6			0			
30	6	1.6							0		0	
31					2	0.8			0			
6/ 1									7	2.6	0	
2	1	0.5							0			
3							1	0.8	4	0.2	1	+
4												
5												
6												
7					6	3.1						
Total	70	41.2	52	21.9	64	24.3	106	40.1	103	40.6	189	59.7

1/ Survey area covers Nushagak Peninsula to Cape Newenham; and shows the number of individual herring spawnings and linear miles of spawn.

(Literature Cited: 1)

Appendix Table 7. Exvessel value of the commercial herring and spawn on kelp harvest, Togiak district, Bristol Bay, 1967-83. 1/

	Estimated Exvessel Value in Thousands of Dollars 2/			
	Herring			
Year	Sac Roe	Food/Bait	Spawn on Kelp	Total
1967	$ 11	$	$	$ 11
68	7		8	15
69	4		1	5
70	2		6	8
71			8	8
1972	4		9	13
73	2		2	4
74	24		19	43
75	9		22	31
76			127	127
1977	447		116	563
78	2,635		120	2,755
79	6,561	180	249	6,990
80	3,055	150	95	3,300
81	3,988	1	250	4,239
1982	6,070	105	176	6,351
83	10,450	67	284	10,801
17 Year Total	$33,269	$503	$1,492	$35,264
1967-76 Total	63		202	265
1977-83 Total	33,206	503	1,290	34,999
17 Year Average	$ 2,218	$101	$ 93	$ 2,074
1967-76 Average	8		22	27
1977-83 Average	4,744	101	184	5,000

1/ Value paid to the fishermen.
2/ Exvessel value derived from price per pound times commercial harvest.

(Literature Cited: 1)